Canovision 8

SERVICE MANUAL

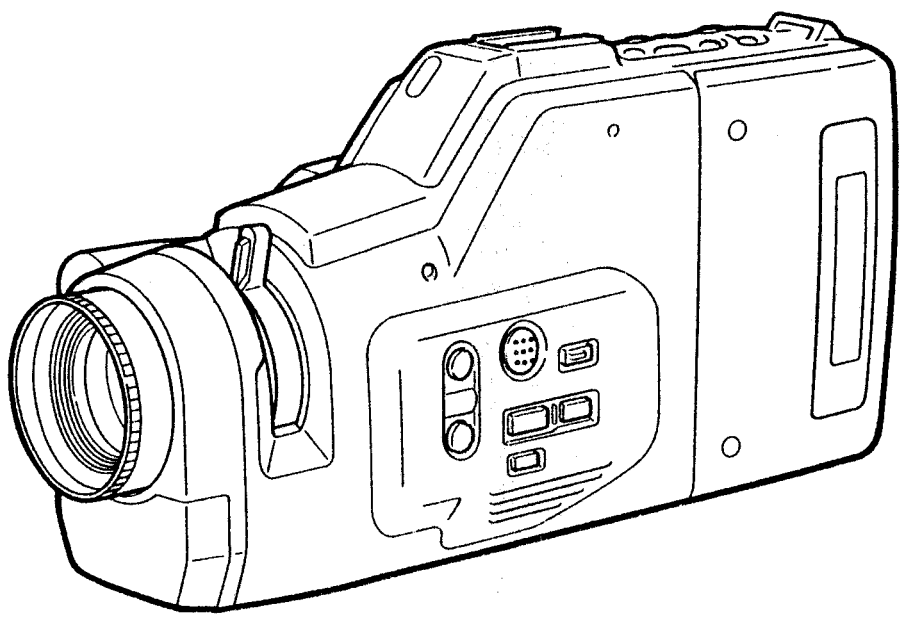
E80E,F

(REF.NO.D15-1430,1470)

8mm Video Camera & Recorder

PAL

SECAM



DY8-1151-430-000

Canon Inc.
Video Technical Service Dept.
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SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine CANON replacement parts.
   Especially critcal parts in the power circuit block should not be replaced with other makes.
   Critical parts are marked with ⚠ in the schematic diagrams.
2. The primary source of X-ray radiation in this viewfinder is the picture tube. The tube used in the viewfinder is especially constructed to limit X-ray radiation emission. For continued X-ray radiation protection, the replacement tube must be same type as the original, CANON approved one.
3. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been oberheated or damaged by the short circuit.
4. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
5. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

5-1 Leakage Current Cold Check

1) Unplug the AC cord and connect a jumper between the two prongs on the plug.
2) Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metalic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metalic part has a return path to the chassis, the reading should be between 1MΩ and 5.2MΩ. When the exposed metal does not have a return path to the chassis, the reading must be ∞.

5-2 Leakage Current Hot Check

1) Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2) Connect a 1.5KΩ 10 watt resistor, paralleled by 0.15μF capacitor, between each exposed metalic parts on the unit and a good earth ground such as a water pipe, as shown in figure 1.
3) Use an AC voltmeter, with 1000Ω volt or more sensitivity, to measure the potential across the resistor.
4) Check all exposed metallic parts of the cover (Cable connection, Handle bracket, metallic cabinet. Screwheads, Metallic overlays, etc), and measure the voltage at each point.
5) Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6) The potential at any point should not exceed 0.75V RMS.
   A leakage current tester (FLUKE MODEL: 8000A equivalent) may be used to make the hot checks.
   Leakage current must not exceed 0.5 milliamp.
   In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.

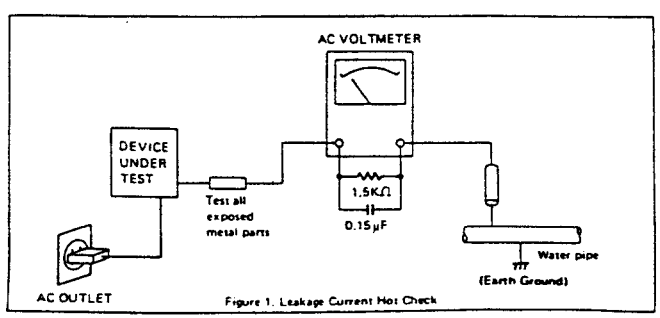

Figure 1. Leakage Current Hot Check

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CHAPTER I. GENERAL DESCRIPTION OF PRODUCT

1. Outline

E80 is a compact but powerful video camera recorder which has been developed with top priority given to stable operability in order to allow even a novice to produce his unique documentary in a more free-and-easy way than ever.

1-1 Features

1) EVF built-in rotary grip designed according to human engineering
At any shooting posture possible, E80 can be held in a natural manner, relieving your wrist of an excessive burden.

2) Full-featured documentary functions
Comprise auto date, title display and various timers which are indispensable for recording a child's growth.

3) High-performance 6-power Auto Focus (AF) zoom lens

4) Superb picture search function which permits quick cue search on edited pictures

5) Space of use further broadened owing to the wireless controller

1-2 Specifications

1-2-1 General

Power supply	:	6 V DC
Power consumption	:	8.3 W or less (in FF), 7.2 W (in REC)
Weight	:	Approx. 1.2 kg (main unit only), approx. 1.4 kg (with battery pack and cassette tape)
Dimensions	:	118 (W) x 121 (H) x 280(D) mm
Performance guarantee environment	:	0°C to 40°C, RH 85% or less
Operation guarantee environment	:	-5°C to 45°C, RH 60% or less
Signaling principle	:	PAL standard color video signal

1-2-2 Lens Section

Focal length	:	9 mm to 54 mm (zoom ratio: 6-power)
Aperture ratio	:	1:1.4 (F1.9 at telephoto end)
Lens configuration	:	14 elements in 12 groups
Angle of view	:	Diagonal ; 47°55' to 8°30' Horizontal; 39°10' to 6°50' Vertical ; 29°50' to 5°05'
Minimum focusing distance	:	1.2 m
Zooming	:	Power zooming (approx. 8 seconds), manual zooming possible
Macro focusing	:	Wide-macro function
Macro shooting distance	:	4 mm min. (from front end of lens element), AF impossible
Filter diameter	:	46 mm (P = 0.75)
Iris control	:	Auto iris with servocontrol system
AF principle	:	Infrared beam, active triangulation system
AF working range	:	1.2 m to approx. 9 m (with reflectance of 20%) Automatically focused to infinity when subject distance is unmeasurable or infinite.

AF working illumination range	:	0 lux to 520,000 lux
AF response speed	:	Approx. 3 seconds (closest distance to infinity; Infinity to closest distance)
AF mode	:	2-step selection between continuous and manual

1-2-3 Camera Section

Pickup device	:	1/2-inch CCD solid-state imaging device with 300,000 pixels
Spatial modulation frequency	:	4.83 MHz
Color separation	:	Color difference line sequential system
Synchronization	:	Internal synchronization
Scanning	:	625 lines, 50 fields/25 frames
Minimum subject illumination	:	7 lux
Subject illumination range	:	7 lux to 100,000 lux
White balance	:	2,800°K to 8,000°K
Exposure correcting function	:	BLC (BackLight compensation with iris opened in about 2 steps)
Fading	:	Video audio-sync white fading (in approx. 4 seconds), date/time display excluded from fading
High-speed electronic shutter	:	1/1,000 sec, 1/500 sec
Built-in microphone	:	Electret condenser microphone, detachable, non-directional

1-2-4 EVF Section

Type of electronic viewfinder	:	Incorporated in rotary grip, 0.7-inch monochrome CRT
Angle adjustment	:	Possible at ±90° vertically. Click provided at top/bottom 4 locations
CRT resolution	:	Approx. 220 horizontal lines (for camera EE)
Finder display	:	In characters (alphabetic)
Ratio of visual field	:	Approx. 90% (versus full scan monitor)
Diopter adjustable range	:	0 to -4.0
Eye cup	:	Stationary type

1-2-5 Recorder Section

External microphone	:	Input impedance	; External microphone ... 600 Ω
		Signal level	; External microphone ... -64 dBV (600 Ω)
Video output	:	Output impedance	; 75 Ω
		Signal level	; 1 Vp-p
		Luminance signal S/N	; 43 dB max.
		Color signal S/N	; 40 dB max.
		Horizontal resolution	; Max. 230 TV lines (at center of VTR output) Max. 330 TV lines (at center of camera section line output)
Audio output	:	Output impedance	; 3 kΩ or less
		Signal level	; -10 dBV (line)
		Frequency characteristic	; 40 Hz to 14 kHz (line input)
		Audio signal S/N	; Microphone input ..... 40 dB

Recording method	:	Rotary double-head helical scanning, azimuth recording
	Video signal	; Luminance signal ..... FM modulation Color signal ..... Low frequency conversion
	Audio signal	; FM system (monaural)
	Tracking	; Four-frequency pilot tracking (ATF)
Tape speed	:	20.051 mm/sec. (SP), 10.026 mm/sec. (LP)
Recording time (with use of P5-90)	:	1.5 hours (in SP mode) 3 hours (in LP mode)
Recording tape	:	Conforming to 8 mm video cassette tape specifications
	Kind of tape	; Metallic tape of coated type (MP)
	Tape thickness	; 13 μm, 10 μm
Recording function	:	Camera recording
	Timer recording	; Self-timer recording (SELF) Self-recording started after approx. 10 sec. (SELF 30) Self-recording started after approx. 30 sec. (Recordable 30 sec. approx.) Interval timer recording (INT. 10) Recording for 0.5 sec repeated at 10-sec intervals (INT. 20) Recording for 0.5 sec repeated at 20-sec intervals (INT. 60) Recording for 0.5 sec repeated at 60-sec intervals
Playback function	:	Normal palyback ; SP/LP automatically switched over
	Special playback	; Still picture frame playback ... Still frame can be reproduced with double-head drum. Fast forward palyback ... Approx. 9 times faster (noise bar fixed) Rewind playback ... Approx. 7 times faster (noise bar fixed)
Other optional functions	:	Auto date recording ; Time and date can be displayed and recorded. Display is erasable.
	Title recording	; Title superimposed by use of built-in titler (character generator)
	Sepia tone recording	; Possible
	Picture search	; Possible. With camera recording interrupted, tape can be played back (in forward/reverse direction) by manipulating the picture search buttons (+, -).
	Rec. review	; Possible. With camera recording interrupted, picture for about 3 sec immediately before is automatically played back when pressing the recording check button.

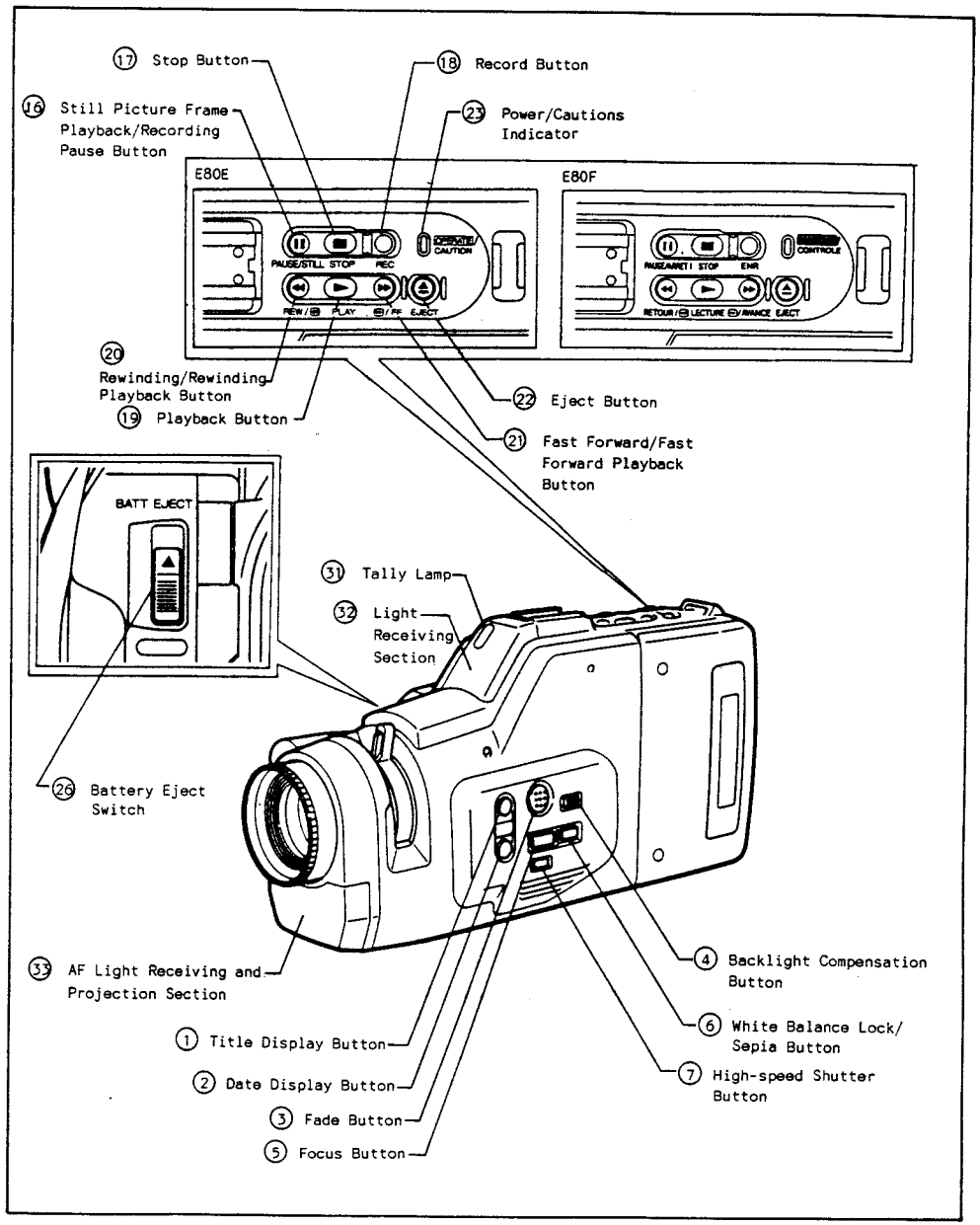


Fig. I-1

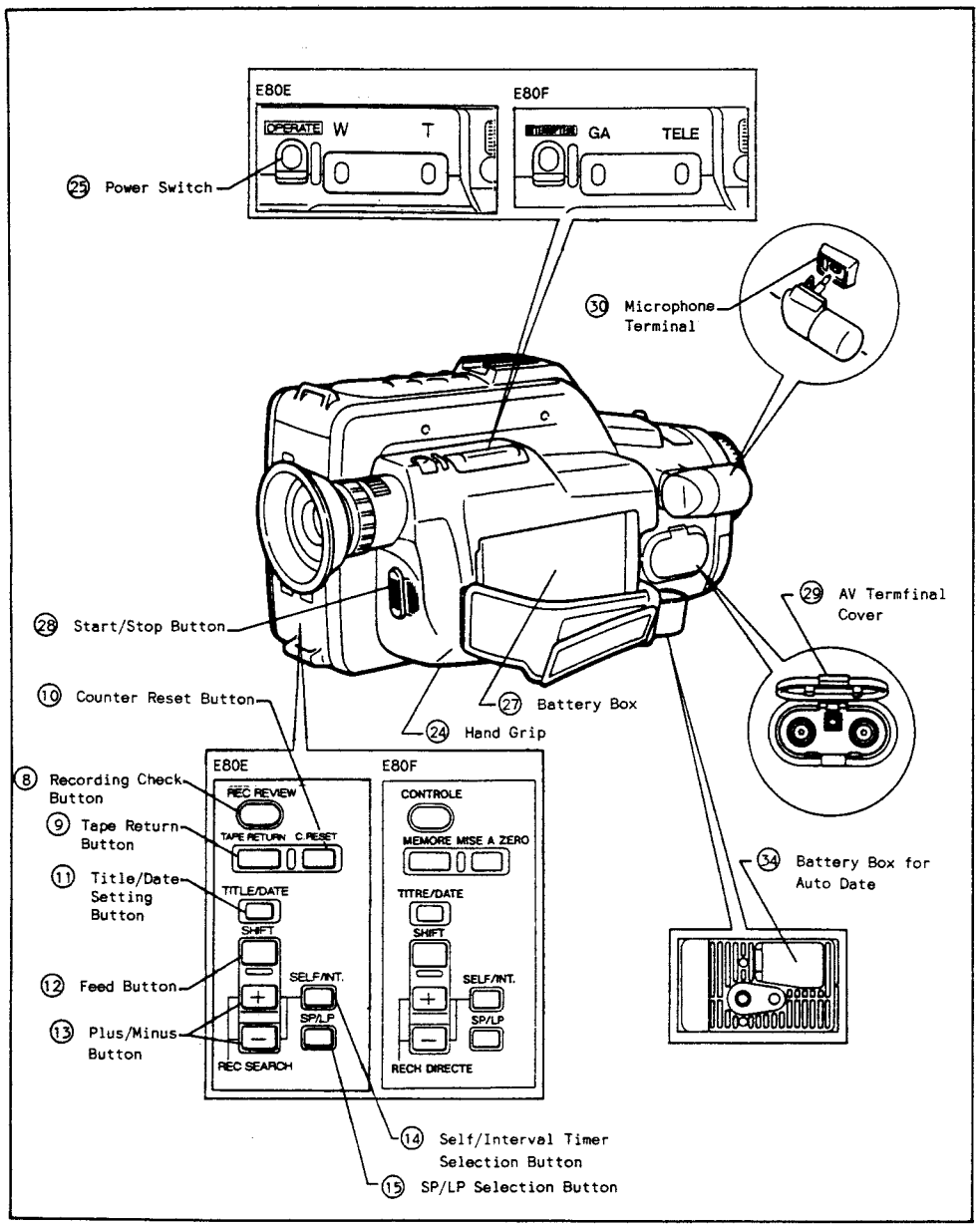


Fig. I-2

1-4 Outline of Operating Section

(Right side face)

① Title display button [TITLE]
When pressed in camera mode, a title generated in advance is displayed in the EVF.
In camera recording, title superimposition is allowed.

② Date display button [DATE]
When pressed in camera mode, date/time display appears in the EVF. In camera recording, date/time superimposition is allowed.

	23. JAN. 1988					23. JAN. 1988
No display ⇨		⇨ No display ⇨	12:34 AM	⇨ No display ⇨	12:34 AM
(at power-on)	(Date only)		(Time only)		(Date and time)

③ Fade button [FADE]
When keeping this button pressed in camera mode, both picture and sound gradually diminish (fade-out). Upon releasing the button, they gradually appear or increase (fade-in). Fading is limited to white and character display in the EVF cannot be faded completely. Not interlocked with the trigger button.

④ Backlight compensation button [BLC]
When keeping this button pressed in camera mode, the iris opens by approximately 2 steps.
On releasing the button, normal status is automatically restored. Character display does not appear in the EVF with regard to backlight compensation.

⑤ Focus button [AF/MANUAL]
When pressed in camera mode, auto focusing and manual focusing are selected alternately. In manual focusing mode, "M. FOCUS" appears in the EVF. Immediately after the power turned on, AF mode is set automatically.

⑥ White balance lock/sepia button [AWB LOCK/SEPIA]
When pressed in camera mode, white balance of full-auto white balance can be locked or sepia tone monochrome picture can be selected.

- White balance lock
  When pressed in camera mode at auto white balance mode is selected, the current white balance is locked and "WB LOCK" is displayed in the EVF. By pressing the button again, the locked status is released and full auto white balance mode returns.

- Sepia recording
  When pressed for 3 seconds or longer in full auto white balance mode, it is switched over to sepia recording mode and "SEPIA" appears in the EVF. Upon pressing the button again, the sepia recording mode is canceled and the full auto white balancing returns.

	Just push once for locking current white balance.		
FAWB	⇨		⇨ FAWB
	Press for about 3 seconds to select sepia recording.		

⑦ High-speed shutter button [SHUTTER]
When pressed in camera mode, the shutter speed can be switched either 1/1000 or 1/500 sec.

Normal mode (1/60 sec)	⇨ 1/1000 sec	⇨ 1/500 sec	⇨ Normal mode
(no display at power-on)			

(Back face)

⑧ Recording check button [REC REVIEW]

When pressed while camera recording is at a pause, recorded portion of last 3-second can be reviewed to check if the recording is normally made on tape. This is effective only for picture and no characters appear in the EVF. (Sound no reviewable)

⑨ Tape return button [TAPE RETURN]

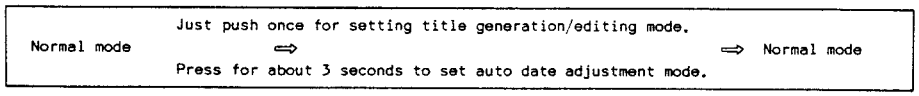
When pressed in stop mode, tape is automatically rewound or rapidly fed up to the tape counter reading "0000".

⑩ Counter reset button [C. RESET]

When pressed in any mode, the counter is reset to "0000".

⑪ Title/date setting button [TITLE/DATE]

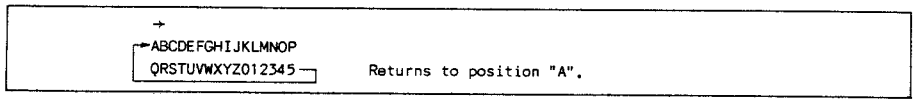
When pressed in camera mode (except while recording), the title generation/editing mode is set, and it is switched over to the auto date adjustment mode when keeping the button pressed for about 3 seconds. Press the button again in the title editing mode for returning to the normal mode.



⑫ Feed button [SHIFT]

° Title generation/editing mode

When this button pushed, the cursor (flickering) moves to the next position on the right.



° Auto date adjustment mode

When this button pushed, the adjustable point blinks. It moves in the following sequence; year → month → day → hour → minute. When pressed after "minute", the adjustment mode is released (adjustment is terminated).

⑬ Plus button/minus button [+]/[-]

° Picture search

When keeping the [+] or [-] button pressed during camera recording is at a pause, pictures recorded on tape are played back forward or backward in the EVF while the tape runs forward or backward. Hence, cue search is possible without changing over to the playback mode.

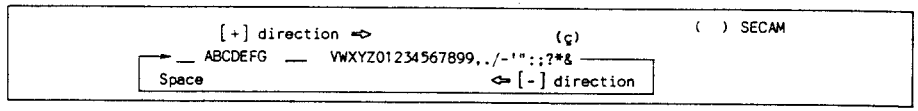
° Selection of timer recording mode

When the [+] button pressed at timer recording mode, the cursor ([ ]) advances, and it returns by pressing the [-] button from the timer mode setting.

[SELF]		SELF		SELF		SELF		SELF		[SLEF]	
SELF 30	⇨	[SELF 30]	⇨	SELF 30	⇨	SELF 30	⇨	SELF 30	⇨	SELF 30	⇨ [+]
INT. 10		INT. 10		[INT. 10]		INT. 10		INT. 10		INT. 10	
INT. 20	⇦	INT. 20	⇦	INT. 20	⇦	[INT. 20]	⇦	INT. 20	⇦	INT. 20	⇦ [-]
INT. 60		INT. 60		INT. 60		INT. 60		[INT. 60]		INT. 60	

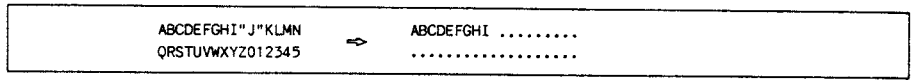
° Feeding and returning of title character

When the [+] button pressed in the title generation/editing mode, the character on the cursor changes as shown below. The character display is reversed by pressing the [-] button.



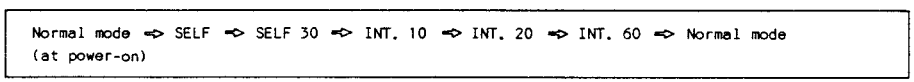
° Title clearing

When both [+] and [-] pressed simultaneously during title generation or editing, the characters on the cursor and thereafter (right side) are cleared.



⑭ Self/interval timer selection button [SELF/INT.]

When pressed while recording is at a pause, the normal recording mode or the timer recording mode is selectable.



⑮ SP/LP selection button [SP/LP]

SP or LP recording mode is selectable at REC PAUSE FF, REW or STOP mode.

(Main unit top)

⑯ Still picture frame playback/recording pause button [PAUSE/STILL]

When pressed in playback, the still picture frame playback mode is set. When pressed in still picture frame playback, playback mode is selected. When pressed in recording, it is paused, and recording restarts when pressed in the pause mode.

⑰ Stop button [STOP]

When pressed, tape stops running.

⑱ Recording button [REC]

When pressed in stop or at still picture frame playback mode, the recording pause mode is set.

⑲ Playback button [PLAY]

Playback starts when pressed in other than recording mode.

⑳ Rewinding/rewinding playback button [REW/ ◁◁]

When pressed in stop status, tape is rewound, and rewinding playback is effected when kept pressed in playback. On releasing the button, playback mode returns. Rewinding playback is also effected only while this button is kept pressed during tape rewinding.

㉑ Fast forward/fast forward playback button [▷▷/FF]
When pressed in stop status, tape travels in FF mode, and when kept pressed during playback FF playback is set. On releasing the button, the original playback mode returns. FF playback is also effected only while this button is pressed with the tape running in FF.

㉒ Cassette ejection button [EJECT]
When pressed in other than recording mode, the cassette tape is ejected. The button functions even when the power switch is turned off as far as the power source is connected.

㉓ Power supply/caution lamp [OPERATE/CAUTION]
This lamp lights up during the power supplied. It flickers at 1-sec if the abnormal state such as power failure etc. is occurred.

(Left side face)

㉔ Hand grip
Can be turned vertically at about 90° (clicks provided at every 22.5° approx.).

㉕ Power switch [OPERATE]
Turns on/off power supply.

㉖ Battery ejection switch [BATT EJECT]
Slide this switch upward for ejecting the power unit from the battery box.

㉗ Battery box
Accommodates the power unit such as battery pack and coupler.

㉘ Start/stop button (trigger button)
Upon pressing this button when recording is at a pause, recording restarts. It pauses again when pressing the button once more. In playback, the button also functions to select mode between normal playback and still picture frame playback. On pressing the button when timer mode is selected, timer recording starts. The recording pauses when pressed during the timer recording.

㉙ AV terminal cover
Houses AV output terminals.

㉚ Microphone terminal [MIC]
When microphone unplugged, an external microphone (low impedance) can be connected.

(Front)

㉛ Tally lamp
Flickers during camera recording or activation of the self-timer. Lit on reception of remote controler's signal.

During normal REC/self-timer REC	ON 0.5 sec/OFF 0.5 sec
During self-timer standby/interval timer REC	ON 0.5 sec/OFF 1.5 sec
On reception of remote control signal	Lit

㉜ Light receiving section
Window for receiving signal from the remote controller. Light receiving angle is about 30° in the horizontal direction and about 15° in the vertical direction.

㉝ AF light receiving and projecting section
This section projects infrared beam and receives reflected light. Also serves as a visible light cut filter.

(Bottom)

㉞ Battery box for auto date
Accommodates a lithium battery for auto date. This battery has a lifetime of about 1 year.

1-5 Canon E80/E808 Video System Chart

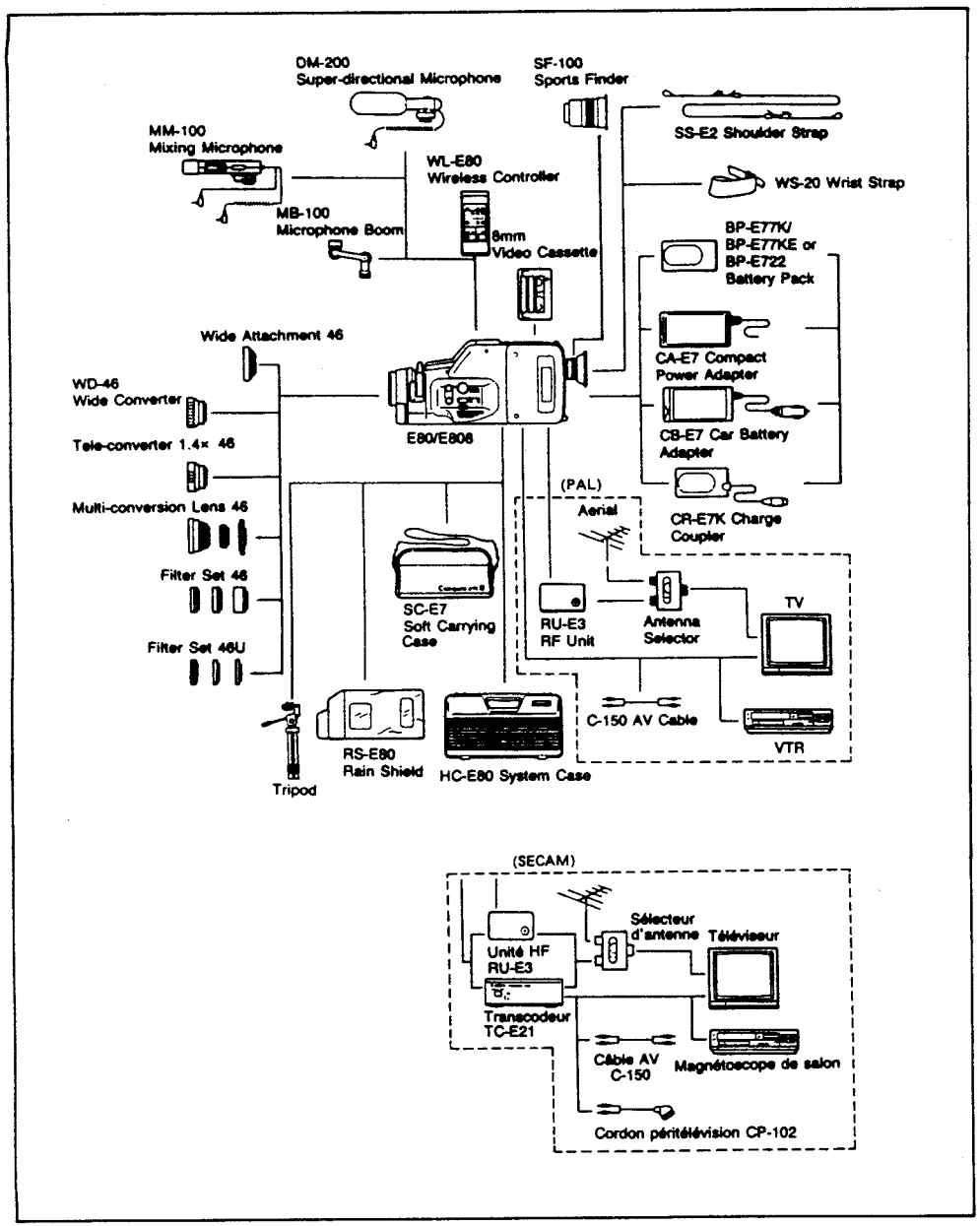


Fig. I-3

2. Circuit Operations

2-1 Lens Section

2-1-1 Optical System

The optical system is identical with the one comprised in the foregoing E70.

2-1-2 AF Mechanism

The AF mechanism also remains the same as the E70's. It employs a combination of the active auto focus by use of near infrared beam and the parallel prism. Note, however, that the AF circuit operates differently.

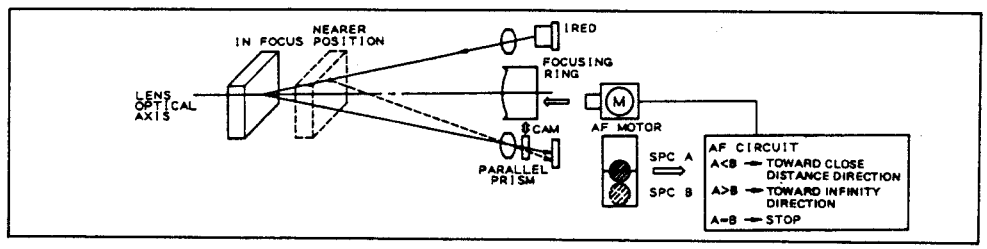


Fig. I-4

2-1-3 AF Circuit

(1) IC configuration

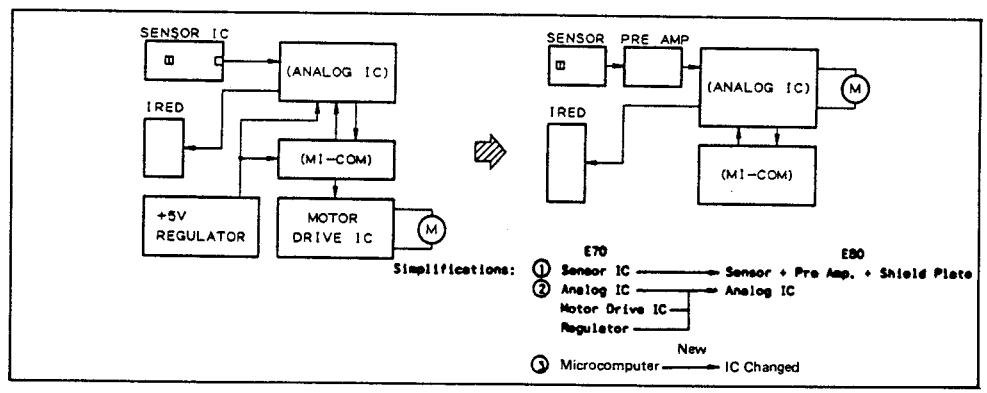


Fig. I-5

Figure I-5 shows each configuration diagram of E70 and E80. Cost reduction has been achieved through simplification of the circuit. The function of each IC is briefed below.

① IC4001 (analog IC)
Takes charge of signal processing, IRED drive, motor drive, etc.. Incorporates a +5 V regulator.

② IC4002 (microcomputer)
Takes control over IC4001 mode selection, etc..

(2) Operating principle of AF circuit

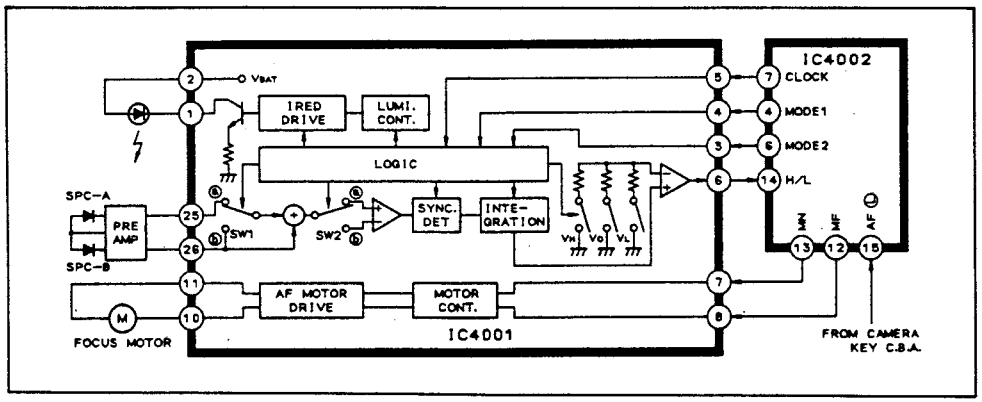


Fig. I-6

① Focus judgement

The near infrared beam emitted from the IRED is reflected by a subject and detected in SPC-A/B. After amplification, the signal is input to the IC4001.
In the IC4001, the sum of SPC output (A + B) is subjected to descending integration for the determined time (basically for 40 counts). Then switches 1 and 2 in the IC are turned to ⓑ side. Ascending integration is done depending on B x 2 signal (SPC-B output x 2) and time is counted until zero crossing is reached.
The number of counts is compared between descending integration (count Ⓐ) and ascending integration (count Ⓑ) in order to control the AF motor so as to obtained equal counts.

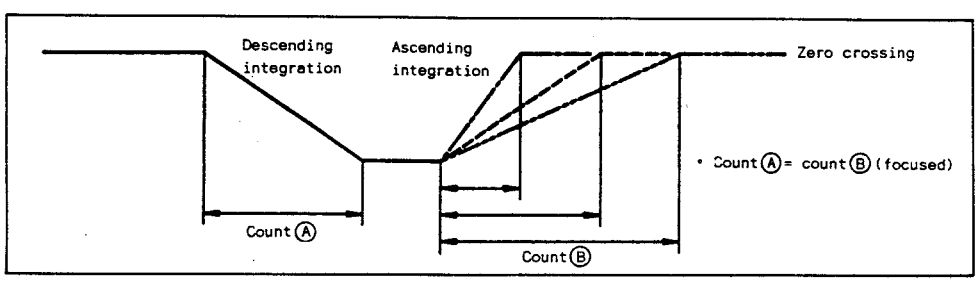


Fig. I-7

② Mode transition (Refer to Fig. I-6)

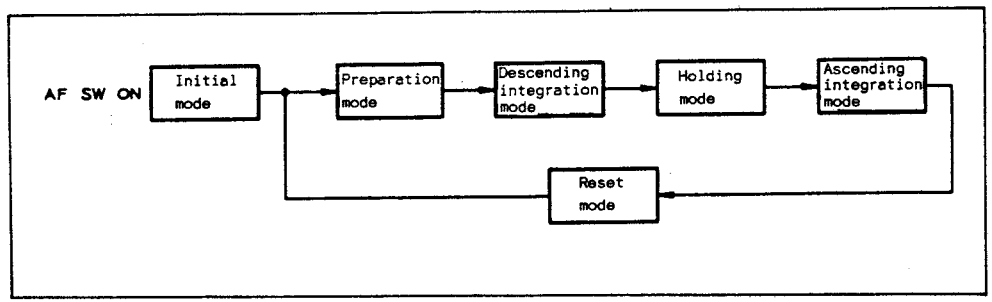


Fig. I-8

1) Initial mode

When the power is turned on and AF Ⓛ signal is fed to pin 15 of IC4002, Ⓗ signal is input to pins 3, 4 and 5 of IC4001.
This resets IC4001 to set the initial mode.

2) Ready mode

When Ⓛ signal is output from pins 4, 6 and 7 of IC4002, IC4001 enters into ready mode.
In this mode, the light emission level of IRED is decided at first.
At the first operation, the maximum light emission level is employed and from the next time on, decision is made with reference to the previous judgement. Light emission level (current level of IRED) is specified to IC4001 from the microcomputer by means of MODE2 pulses.

No. of pulses : 1 to 8 (One additional pulse doubles the current light emission level.)

Light emission level : Min. to max.

After determination of light emission level, IRED emits light 16 times for offsetting and the offset automatic adjustment circuit sets integration output to zero when no signal is available.

3) Descending integration mode

Then MODE1 turns to Ⓗ for the descending integration mode. In this mode, both switches 1 and 2 turn to ⓐ side and synchronization detecting output signals (A + B) are subjected to descending integration.
Upon completion of integration for the determined time period (corresponding to 40, 80 or 160 counts), MODE1 turns to Ⓛ and the holding mode is set.

4) Ascending integration mode

Input of 1 pulse from the MODE1 terminal selects the ascending integration mode.
Switches 1 and 2 turns to ⓑ side, and ascending integration is performed according to B x 2 signal. When the integral value cross V_O, comparator output is inverted and the microcomputer stores the ascending integration time (counts) in memory. According to that count value, the AF motor is controlled.
Because descending integration should be constant, light emission level is controlled so that A + B integration value settled between V_H and V_L.
As just the control of light emission level is not sufficient, integration time is switched over among 3 steps, 40, 80 and 160.
Judgement is made as ∞ (infinity) in case integral value does not reach V_L level with both light emission level and integration time at maximum.

2-2 Camera Section

2-2-1 Power Supply Circuit

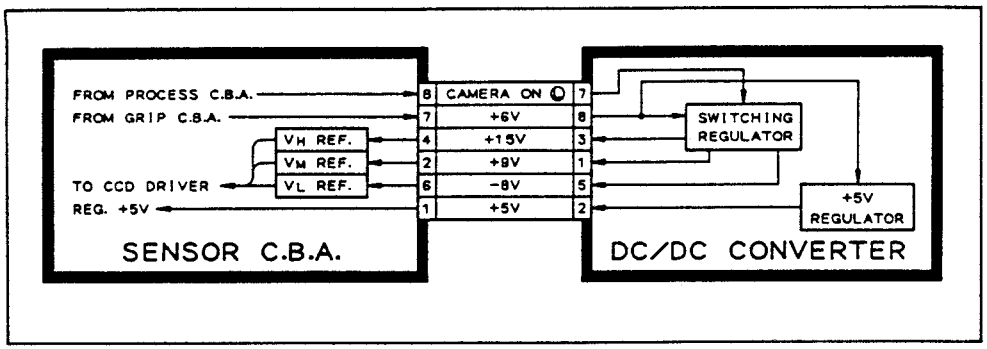


Fig. I-9

The power supply circuit of camera section consists of a DC/DC converter, and V_H, V_M and V_L in the sensor C.B.A.

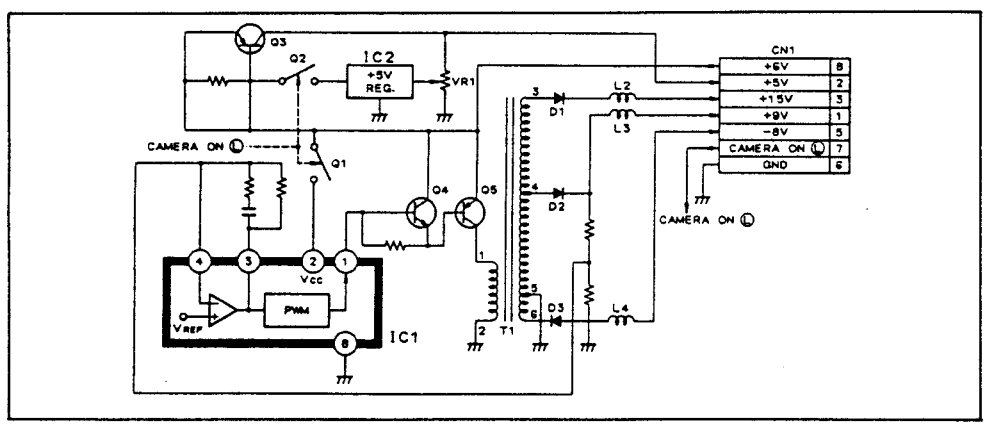


Fig. I-10

(1) DC/DC converter

To operate the DC/DC converter, the power supply (6 V) and IC1 power supply (CAMERA ON (L)) are required. The CAMERA ON (L) signal is applied to pin 7 of CN1 and input to the base of Q1 for activation. In consequence, power is supplied to pin 2 of IC1 and PWM signal is output from pin 1 of that IC.

According to the PWM signal, Q4 and Q5 are controlled for switching the 6 V power supply. The pulse, which is output from pin 3 on the secondary side of T1, is rectified and smoothed in D1, L2, etc. and output from pin 3 of CN1. Pulse outputs from pins 4 and 6 of T1 are also rectified and smoothed, and then output as +9 V and -8 V from pins 1 and 5 of CN-1, respectively.

In addition, the DC/DC converter incorproates a +5 V regulator. When CAMERA ON (L) signal is applied to Q2, Q2 and Q3 start operation. These transistors are regulated by IC2 (3-terminal regulator) so as to output +5 V from pin 2 of CN1. The reference voltage of IC2 is adjustable by VR1.

(2) CCD, V_H, V_M, V_L for V driver and +9 V (in sensor C.B.A.)

+5 V and +15 V from the DC/DC converter are divided with resistors and then subjected to current amplification by Q2051, which are input as V_M (+1 V) and V_H (+13 V) to the CCD V driver IC2051.

For V_L (-8 V), DC/DC converter output is applied to the CCD V driver via the smoothing circuit.

+9 V is utilized as power supply for the CCD H driver circuit and CCD delay line IC2151.

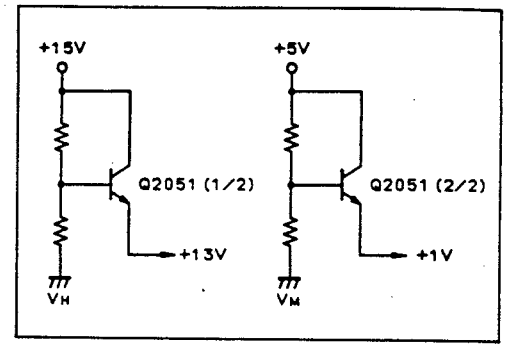


Fig. I-11

2-2-2 Sensor C.B.A.

(1) Configuration

Enumerated below are principal elements of the sensor C.B.A..

(1) IC2101 (CCD)
Similar to the one used in E70 except its model No..

(2) IC2001 (clock generator)
Generates various pulses for CCD drive, etc. Although this IC is identical with the one employed for the E70, 1/500 shutter operating function has been newly added in case of E80.

(3) IC2002 (SSG)
Generates synchronizing signals necessary for the camera section. Although E70 has this IC on the process C.B.A., it is mounted on the sensor C.B.A. in case of E80.

(4) IC2051 (CCD V driver)
Amplifies the pulse from IC2001 to generate CCD V drive pulses (ϕV1 and ϕV2).

(5) Q2052 to Q2057 (CCD H driver)
Amplifies the pulse from IC2001 and thereby generates CCD H drive pulses (ϕH1 and ϕH2) and reset pulse (ϕR).

(6) IC2102 (sample hold)
Samples/holds the output from CCD and outputs it to the process C.B.A..

(7) IC2151 (1H DL)
1H-delays COH and YOH signals applied from the process C.B.A. to generate C1H and Y1H, which are then returned to that C.B.A.. (Y1H and C1H are utilized for V aperture correction and synchronizing color difference signals, respectively.)

(2) 1/500 sec electronic shutter

E80 has newly employed a 1/500-second electronic shutter in addition to the 1/1000-sec one. In the interline CCD, high-speed electronic shutter operation is performed during the vertical blanking period. (Vertical blanking interval approximates 25H = 1.6 msec.)
Because 1/500-sec shutter operation (about 36H = 1.79 msec) is longer than the vertical blanking period, part of screen might be cut off.
However, an ordinary home monitor TV has an effective image range on screen of 85 to 90% when compared with the full scan monitor. Therefore, screen cut at 1/500 sec shutter operation can hardly been seen.
E80's 1/500 sec shutter has been devised based on this subtle distinction.

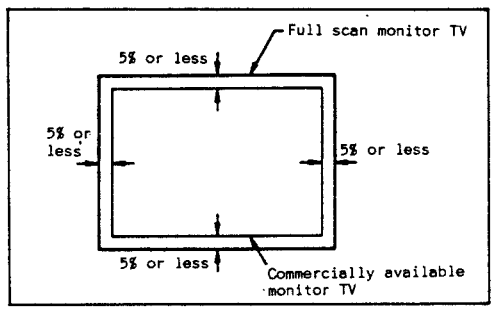


Fig. I-12

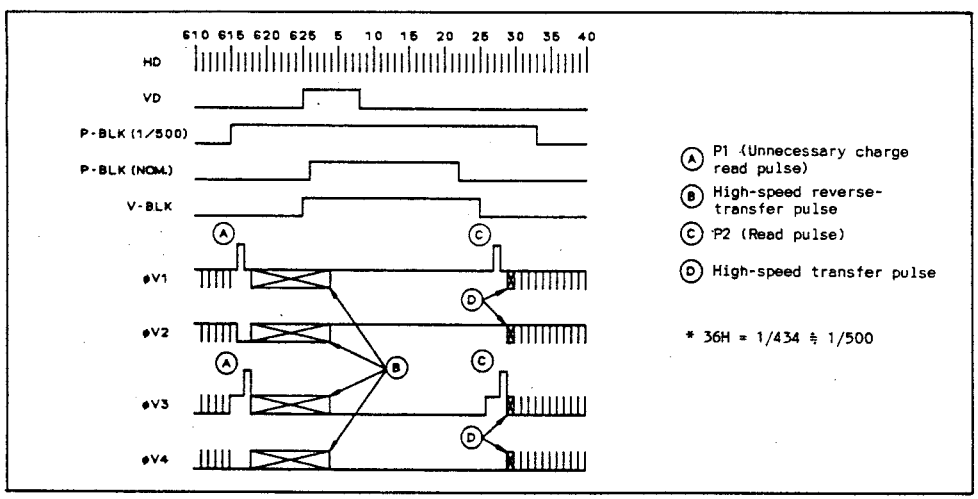


Fig. I-13

1/500 sec shutter operation of E80 is summarized below.

- First unnecessary charge is read by P1 and it is swept out by high-speed reverse transfer pulse. After 28H, P2 reads necessary charge. (36H = 1/434 sec ≒ 1/500 sec)
- While the first reading (of unnecessary charge) and high-speed reverse transfer are conducted, transfer in V-CCD is not terminated. (About 617H to 625H) Hence, the high-speed reverse transfer pulse mixes as noise in the video signal. This period is deleted by P-BLK pulse.
- At the time of 1/500 sec shutter operation, the P-BLK pulse has a longer duration than usual. And *due to its timing, a substantial portion at start of vertical scan might be deleted.* To prevent this, video signal is 7 H advanced by means of high-speed transfer pulse after P2 reading. AS a consequence, screen is cut uniformly at the top and bottom to moderate unnaturalness.

2-2-3 Process C.B.A.

(1) Signal flow (luminance signal line)

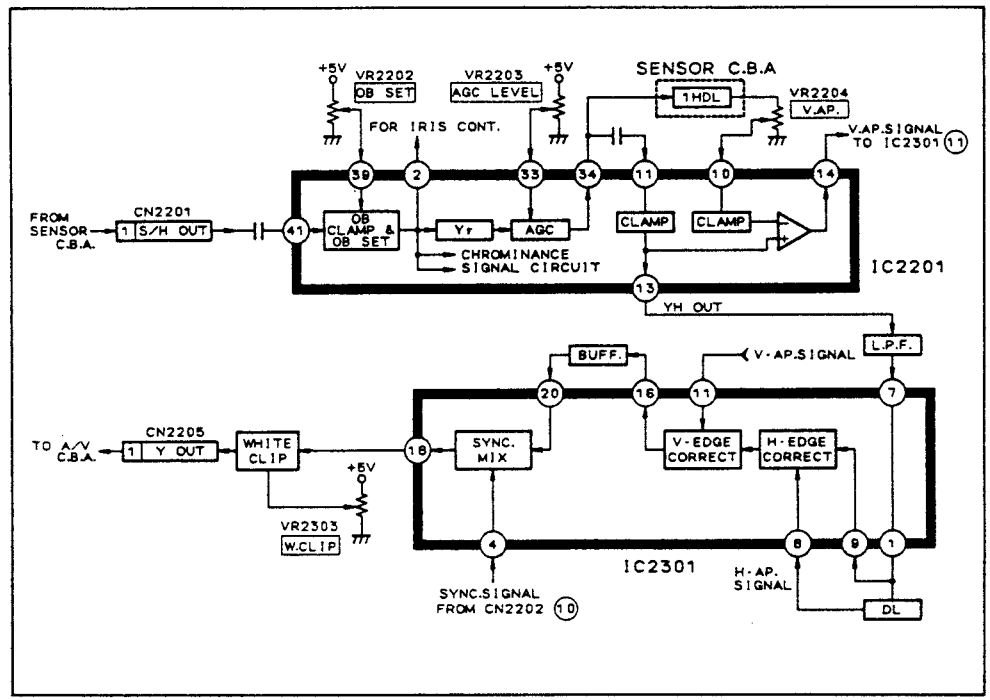


Fig. I-14

S/H OUT signal from the sensor C.B.A. is fed to pin 41 of IC2201. It is divided into 4 routes through OB clamping and OB setting. One is output from pin 2 and used to control the iris.
The other two are branched to chrominance signal lines, and the remaining one is applied to the luminance signal line.
Luminance signal first undergoes gamma correction and then AGC. It is output from pin 34. One of the outputs is sent to the sensor C.B.A. for generating V aperture signal. After delayed by 1H, the signal is fed to pin 10 of IC2201. The other output is input to pin 11 and clamped. Then it is output as YH signal from pin 13. The V aperture signal is output from pin 14 and input to pin 11 of IC2301.
From the main (YH) signal, unnecessary high frequency component is eliminated through LPF. Then the signal is applied to pin 7 of IC2301. After H/V aperture correction, etc., it is output from pin 16. Input from pin 20 is mixed with snyc and burst signal, and is output from pin 18.
Then, after being white clipped, it is output as a luminance signal from pin 1 of CN2205 via the buffer amplifier.

(2) Signal flow (chrominance signal line)

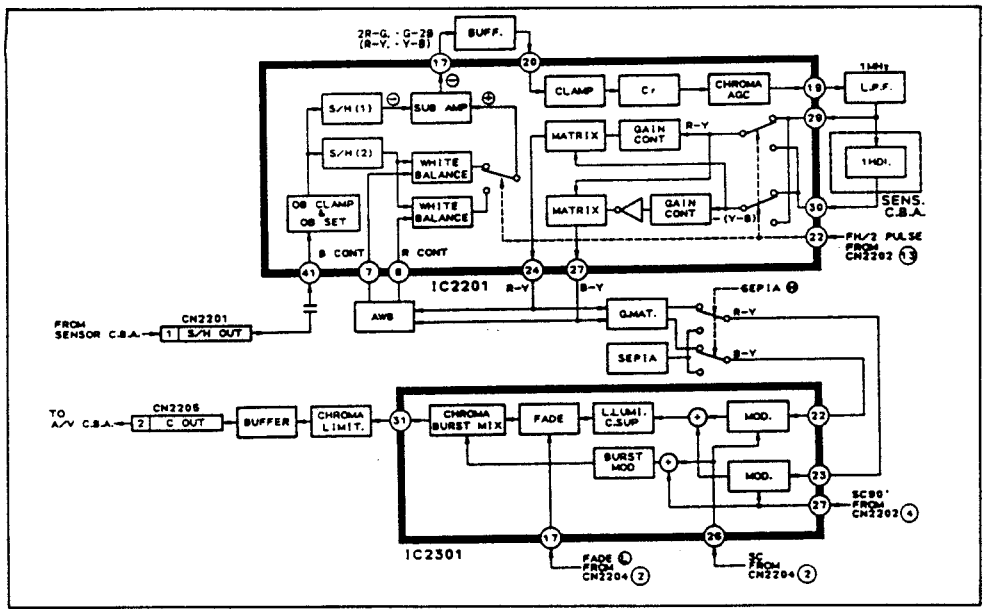


Fig. I-15

S/H signal after processings such OB clamping, etc. is sampled and held by pulses S/H (1) and S/H (2).
From S/H (1) oputput, S/H (2) is subtracted by SUB AMP (subtraction block) in order to take out G-2B and 2R-G signals at 1H intervals.
At this stage, WB CONT voltage is applied from pins 7 and 8 of IC2201. Because of application before SUB AMP, the white balance voltage have to be synchronized by 1/2 fH pulse.
Now from the SUB AMP output, white-balanced 2R-G (marked R-Y hereafter) and -2B-G (also marked Y-B hereafter) are taken out at 1H intervals, which are output from pin 17 (color difference sequencing output).
The color difference sequencing output is fed to pin 20 again. The signal is restricted in its band and divided into two after clamping, gamma correction, AGC block, pin 19 and LPF (1 MHz). Of them, one is delayed by 1H in IC2151 (in sensor C.B.A.) and input to pin 30. The other is directly input to pin 29.
At this point, color difference sequencing is syncrhonized. From the switch onward, a continuous signal of R-Y and Y-B appears. After gain control, inversion (Y-B only) and matrix correction, the signal is output from pins 24 and 27 as R-Y and B-Y signals.
Then the output signal enters IC2301 to be balance-modulated with 3.58 MHz.
This is followed by mixed/low luminance chroma suppression and mixing of fade and burst signals, which is output to pin 31. After clipping high saturation, chrominance signal is output from CN2205 via the buffer amplifier.

2-2-4 White Balance

For white balance, E80 employs a duplex method of one-axis correction and fluorescent lamp correction as in E70. Also E80's white balance is of an inner measurement system (TTL) depending on video signal. Although the basic principle is shared with E70, a "yellow background skin color correction" circuit has newly been added in order to improve the drawback of one-axis correction that skin color becomes bluish on the yellow background.

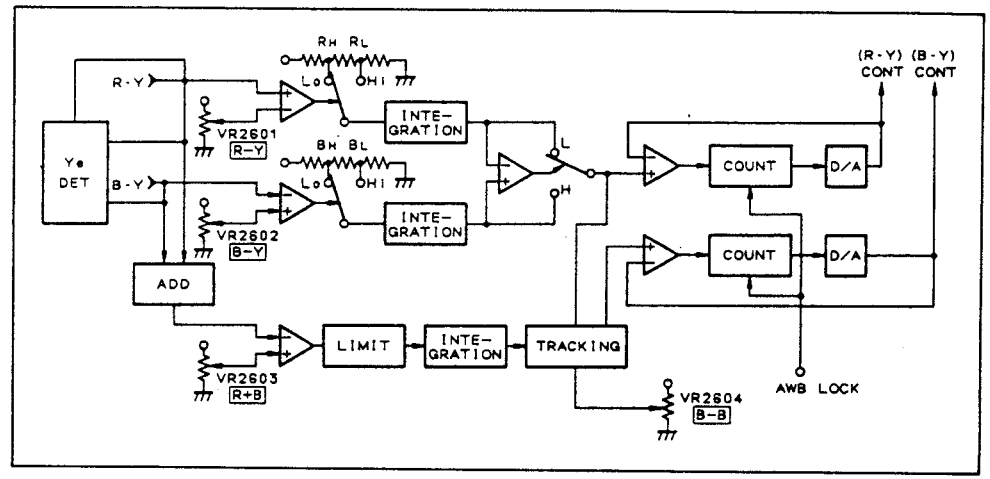


Fig. I-16

(1) Principle of yellow correction

Only when yellow is detected, B-Y signal is mixed with R-Y, whereby color difference in yellow is minimized to diminish the quantity of correction with respect to yellow background.
Let us examine the yellow vector on the coordinates of a vector scope. R-Y is positive, while B-Y is negative. Therefore, addition of B-Y to R-Y attenuates R-Y signal. So the R-Y color difference component of yellow becomes smaller.

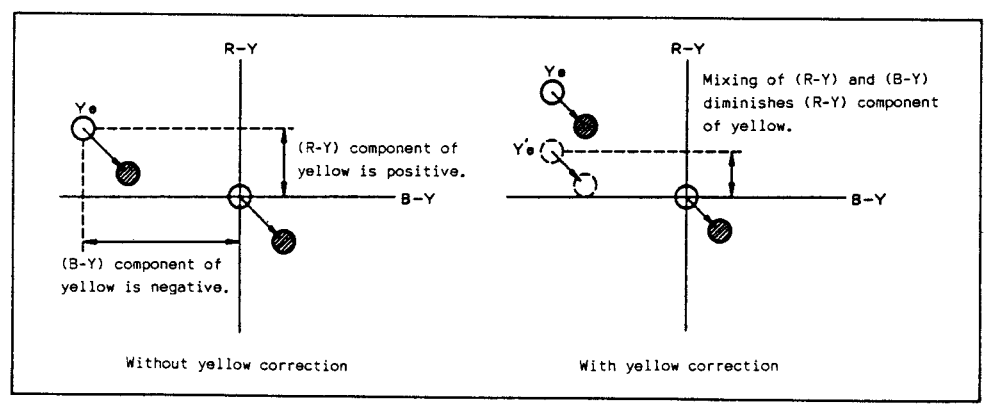


Fig. I-17

(2) Yellow detection circuit

Fig. I-18 shows a block diagram of the yellow detection circuit. On input of yellow signal, each output of comparators (A) and (B) becomes positive. As a result, output of (D) (AND circuit) also becomes positive to turn on Q2601.
Now B-Y signal is mixed with the comparison voltage (R-Y) of comparator (C), which reduces the quantity of yellow correction.
Yellow detection is effective within the range shown in b of Fig. I-19 (c). Quantities of B-Y and R-Y offsets in negative direction are determined according to V_B and V_R.

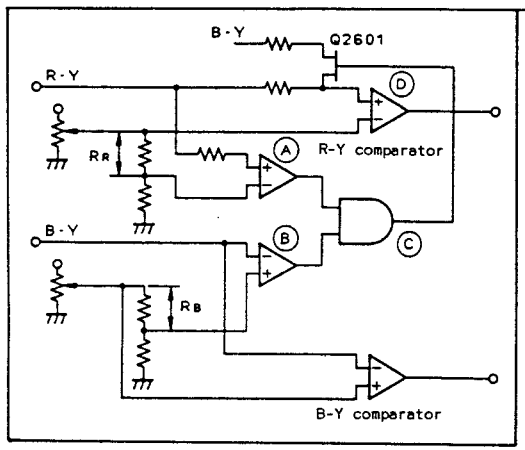


Fig. I-18

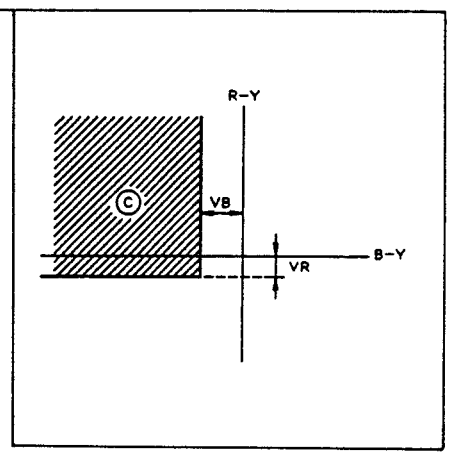


Fig. I-19

2-3 Recorder Section

2-3-1 System Control Circuit

The system control circuit consists primarily of the main microcomputer IC601 and the QD (Quartz Date) microcomputer IC602 on the SS C.B.A.
The main microcomputer IC601 reads each status of keys, sensors, etc. and controls the mechanical unit and signal circuits. It also comprises the function for controlling the servo circuit. For this purpose, control signal is sent to each drive circuit of drum and capstan.
The QD microcomputer IC602, on the other hand, chiefly takes charge of calendar/clock functions and title data storage.

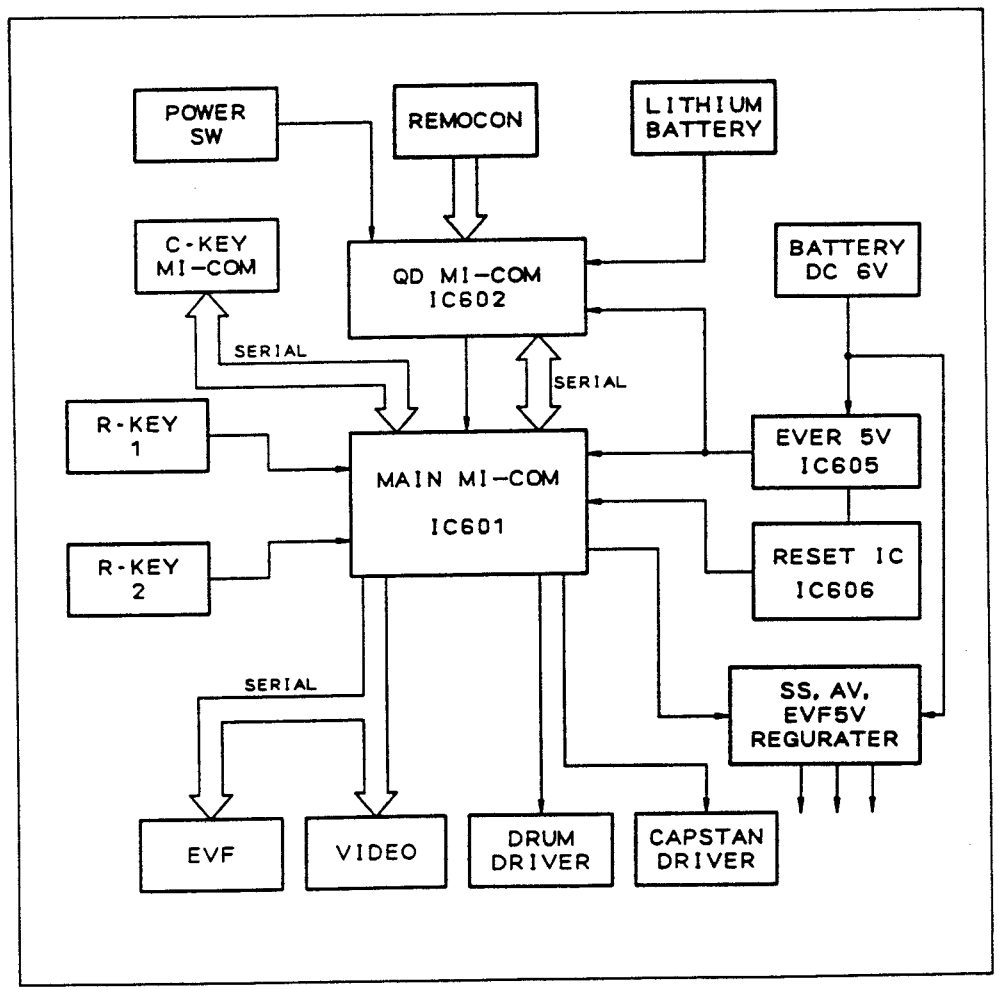


Fig. I-20

(1) Power supply circuit

① Kinds of power sources

The power supply circuit in recorder section receives 6 V DC from the battery or AC adapter and converts it into four levels below to be used in each circuit.
The lithium battery also supplies 3 V DC as back-up power supply.

* EVER 5 V

When power supply is connected to the battery terminal, it is converted into 5 V by the 3-terminal regulator (IC605) on the SS C.B.A.. This output is always avaliable so far as power supply is connected.

* SS 5 V

When turning on the power switch, VTR ON (L) signal is output from pin 29 of the main microcomputer (IC601). This signal turns on Q610 to activate a circuit composed of IC604, Q611 and Q612 whereby constant 5 V output is generated.

* AV 5 V

In the same manner as for SS 5 V, the VTR ON (L) signal from the main microcomputer activates the 5 V generation circuit on the AV C.B.A.. Then, IC107 compares the VR108-defined voltage level with the internal reference voltage level, and the output of transistors Q111 and 112 are controlled to a constant voltage of 5 V.

* EVF 5 V

Regulator (IC2932) on the grip board is used for controlling the output transistor Q2934 to create a constant voltage of 5 V according to the EVF ON (L) signal output from pin 28 of the main microcomputer.

* LITHIUM 3 V

3 V DC supply from the lithium battery is employed for energizing the QD microcomputer in case the normal power supply is disconnected. When the normal power supply is connected or the power switch is turned on, power is received from "EVER 5 V".

* Power-on

When power supply is connected to the battery terminal, IC605 on the SS C.B.A. delivers EVER 5 V as the powr supply to each microcomputer. Then, the RESET signal from reset IC (IC606) is applied to pin 32 of main microcomputer IC601 for resetting. Upon completion of initialization, the microcomputer returns to sleep mode, or it is set in standby status. At this time, the QD microcomputer also stands by in the sleep mode.
When the power switch is turned on, Q620 is activated to apply (L) signal to pin 11 of QD microcomputer. This signal causes the microcomputer to handle interruption for reading the POWER SW ON (L) signal applied to pin 21. And the start pulse is issued from pin 39 to start the main microcomputer. On reception of the start pulse at pin 70, the main microcomputer is reset from the sleep mode and outputs power control signal in response to each mode.
When SS 5 V is generated according to the VTR ON (L) signal appearing at pin 29, Q625 turns on to deliver POWER ON (L) signal to pin 43 of the QD microcomputer as a confirmation of main microcomputer start. Start pulse is issued up to 3 times at intervals of 17 msec. If the POWER ON (L) signal is not detected during issuance of the start pulse, the sleep mode is assumed again.

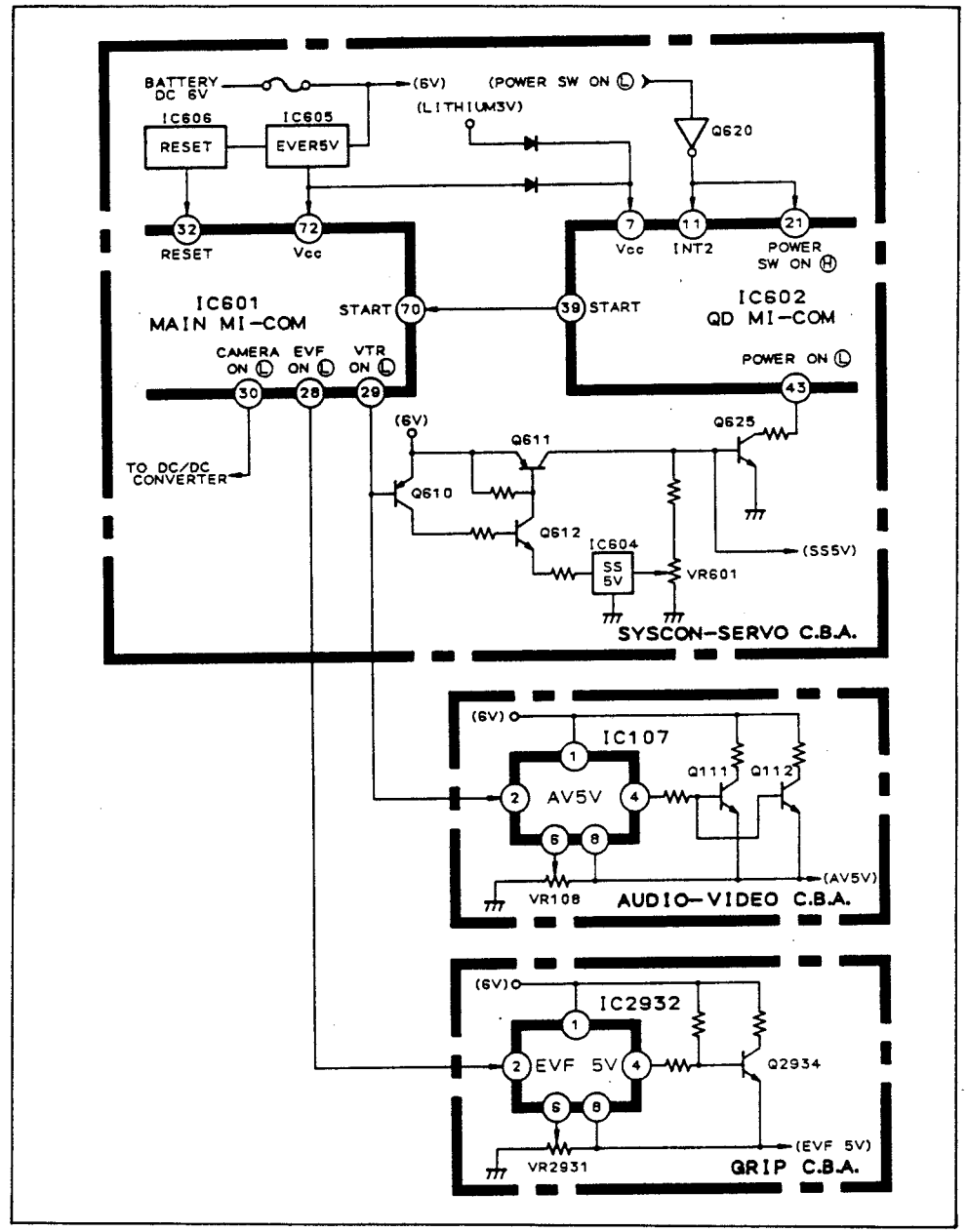


Fig. I-21

(3) Resetting of QD microcomputer

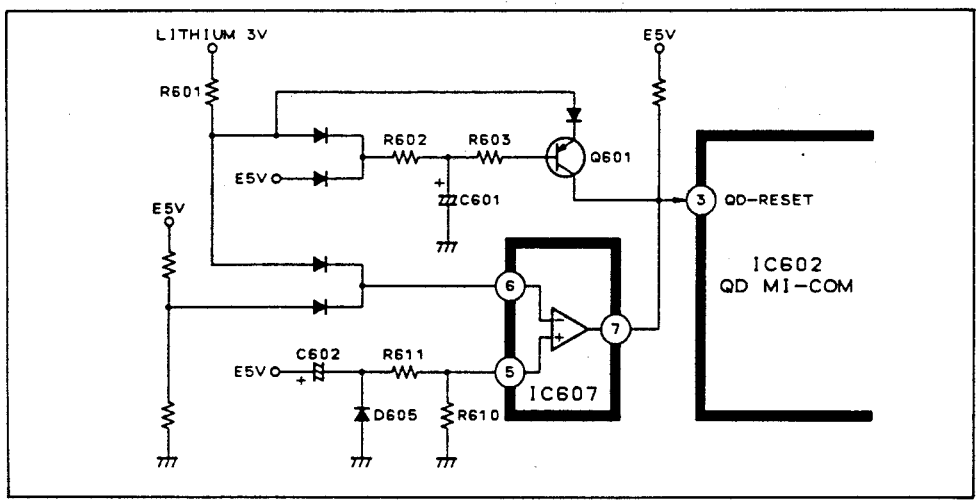


Fig. I-22

This microcomputer is reset in the following cases.

1) Lithium battery is introduced when the main battery is not mounted.
2) Main battery is introduced when the lithium battery is not mounted.

* Case 1)

When the lithium battery is mounted, 3 V is applied to the Q601 emitter, and the potential at Q601 base rises at the timing determined by each time constant of R602 and C601. Reset pulse is not issued before Q601 turns off. On mounting the main battery, the reset pulse is not generated because the transistor base is already at the (H) level.

* Case 2)

When the main battery is mounted, EVER 5 V is output, and pulse is generated at the timing determined by each time constant of C602 and R611, which is applied to pin 5 of IC607. At this time, the comparator in that IC issues the reset pulse from pin 7 to pin 3 of QD microcomputer for its resetting. On mounting the lithium battery, the reset pulse is not generated since 3 V is applied to pin 6 of IC607.

(2) Terminal functions of main microcomputer (IC601)

Terminal	Signal designation	I/O	Function
1	SEL1	O	Controls the frequencies of ATF PILOT signal. PILOT: f_1 f_2 f_3 f_4 SEL1: H L H L SEL2: H H L L
2	HEAD SW. PULSE	O	Head switching pulse output
3	AV PB (H)	O	Selects REC or PB of the video/audio circuit. "H" for PB.
4	JOG (H)	O	Switches over time constant of the RF AGC circuit. "H" for accelerated/decelerated playback.
5	A-MUTE (H)	O	Audio mute signal. "H" for muting.
6	V-MUTE (H)	O	Video mute signal. "H" for muting.
7	LINE IN (L)	O	AV terminal I/O selection signal
8	DRUM FWD (L)	O	Selects turning direction of the head drum motor. "L" for normal (forward) rotation.
9	DRUM ON (L)	O	Head drum motor on/off signal. When this signal goes low, the head drum motor is turned on, and it is turned off and brake is applied when the signal goes high.
10	CAPSTAN FWD (H)	O	Selects turning direction of the capstan motor. "H" for normal (forward) rotation.
11	K-STROBE	O	Serves as the strobe signal for communication with IC2701 (C-KEY microcomputer). Effective during "L" status.
12	QD-STROBE	O	Responds to communication with IC602 (QD microcomputer). Signal is transmitted/received during "L" period.
13	V-STROBE	O	Specifies data read in ICs 201 and 203 (video line ICs).
14	POWER LED	O	"H" to turn on the power LED. Lit when power supply is turned on and flickers at 1-sec intervals for alarm.
15	NC		OPEN
16	NC		OPEN
17	C-STROBE	O	Specifies data read in IC2941 (character IC). This signal is output upon completion of data transmission.
18	ATF SW	O	Selects BFP (16 kHz/47 kHz) for ATF. This signal goes low if an ATF error is detected on the f_1 or f_3 track. And, it goes high on detection of an ATF error on the f_2 or f_4 track.
19	BOT (L)	I	"L" on detection of the beginning of tape
20	EOT (L)	I	"H" on detection of the end of tape
21	CASSETTE DOWN (L)	I	Indicates the input of CASSETTE COMPARTMENT DOWN switch. This signal goes high when the cassette compartment is in an up state, and it goes low when the cassette compartment is in a down state.
22	SAFETY TAB (L)	I	This signal goes low when the cassette erroneous-erase protect switch is set to the ERASE-INHIBIT position.
23	TALLY	O	"H" to turn on the tally LED. This LED flashes at each interval in REC and timer modes, and lights up on reception of remote control signal.
24	MODE SW3	I	Indicate the input of mechanism mode switch. (consists of 3-bit for mechanism status detection)
25	MODE SW2		
26	MODE SW1		
27	TAPE SENS. LED	O	Used to detect BOT/EOT and tape presence/absence.
28	EVF ON (L)	O	EVF power supply control signal. When this signal goes low, the power supply circuit is turned on.

Table I-1 (1)

Terminal Functions of Main Microcomputer (IC601) (continued)

Terminal	Signal designation	I/O	Function
29	VTR ON Ⓛ	O	VTR power supply (SS, AV 5V) control signal
30	CAMERA ON Ⓛ	O	Camera power supply control signal. "L" to turn on the power supply.
31	——		Connected with ground.
32	RESET	I	Inputs microcomputer resetting pulse on connection of power supply.
33	——		Connected with ground.
34	X OUT	O	Connect 8 MHz crystal oscillator.
35	X IN	I	
36	——		Connected with EVER 5 V.
37	QDK-DATA IN	I	Serial inputs of QD, camera key data.
38	QDK-DATA OUT	O	Serial outputs of QD, camera key data.
39	CLOCK 2	O	Clock pulse for QD and K-DATA serial communication
40	QD-REQUEST	I	Inputs communication request signal from IC602 (QD microcomputer). Communicable during "L" period.
41	——		Connected with EVER 5 V.
42	VC-DATA OUT	O	Outputs video and character data in serial communication.
43	CLOCK 1	O	Clock pulse for VC-DATA serial communication.
44	MAIN BATT.	I	Voltage reduction detecting terminal.
45	DEW Ⓗ	I	"H" for warning of dew condensation.
46	T-REEL FG	I	Signal input for detection of T reel turning
47	S-REEL FG	I	Signal input for detection of S reel turning
48	R-KEY2	I	Key input at top of unit
49	R-KEY1	I	Key input at rear of unit
50	SW. POSITION	I	Switching point adjustment terminal
51	ATF ERROR	I	ATF error input terminal
52	——		Connected with ground.
53	——		Connected with EVER 5 V.
54	VCC		Connected with EVER 5 V.
55	SEL(A)	I	Switching terminals for TV sytstem
56	SEL(B)		
57	——		Connected with ground.
58	C-SYNC	I	Sync signal input terminal for rotary servo.
59	ATF LOCK Ⓛ	I	This signal goes low when ATF phase servo is phase-locked normally during playback.
60	D-PG	I	Drum PG signal input terminal
61	D-FG	I	Drum FG signal input terminal
62	C-FG	I	Capstan FG signal input terminal
63	FADE Ⓛ	O	Fade control signal output. Turned on when "L" outputs.
64	SP Ⓗ	O	Goes high in SP mode, low in LP mode.
65	LOADING Ⓗ	O	Loading motor control signals
66	UN-LOADING Ⓗ	O	
67	C-PWM	O	Generates signal for driving the capstan motor.
68	D-PWM	O	Generates signal for driving the drum motor.
69	——		Connected with ground.
70	START	I	Releases standby mode input terminal as specified from IC602 (QD microcomputer).
71	——		Connected with EVER 5 V.
72	VCC		Connected with EVER 5 V.
73	——		Connected with ground.

	DOM	A	E	F
SEL(A)	H	L	L	H
SEL(B)	H	H	L	L

Signal name / Operation	LOAD	UNLOAD	BRAKE
LOAD	H	L	H
UN-LOAD	L	H	H

Table I-1 (2)

Terminal Functions of Main Microcomputer (IC601) (continued)

Terminal	Signal designation	I/O	Function
74	——		Connected with EVER 5 V.
75	CAPSTAN ON Ⓛ	O	Capstan motor on/off signal. When signal is at "L" level, the motor is turned on, and it is turned off or brake is applied when signal is at "H" level.
76	FE ON Ⓛ	O	Flying erase head oscillation control signal. "L" to turn on oscillation.
77	RF PB Ⓗ	O	Signal for selecting REC or PB of head amplifier, ATF IC. "H" for PB.
78	TS B	O	ATF LOCK sampling and hold signal. "L" for sampling and "H" for holding.
79	JOG VD	O	Pseudo VD output to be inserted into video signal at the time of decelerated/accelerated playback.
80	SEL2	O	Controls the frequency of ATF PILOT signal. Refer to terminal No. 1.

Table I-1 (3)

(3) Terminal Functions of QD Microcomputer

Terminal	Signal designation	I/O	Function
1	NC		OPEN
2	———		Connected with ground.
3	QD-RESET	I	Inputs the pulse for resetting the QD microcomputer.
4	NC		OPEN
5	CL1	I	System clock adjustment terminal
6	NC		OPEN
7	VCC		Connected with EVER 5 V.
8	NC		OPEN
9	CL2	I	System clock adjustment terminal
10	INT1	I	Interruption terminal when remote control is employed.
11	INT2	I	Power switch and eject switch interruption terminal Used to release sleep mode.
12	CLOCK 2	I	Clock pulse for QD-DATA serial communication
13	NC		OPEN
14	NC		OPEN
15	QD-DATA OUT	O	Issues output to the main microcomputer (IC601) in serial communication.
16	QD-DATA IN	I	Receives input from the main microcomputer (IC601) in serial communication.
17	WIDE SW Ⓗ	I	Zoom switch input terminals
18	TELE SW Ⓗ	I	
19	MP Ⓗ	I	Goes high with MP tape, and low with ME tape.
20	NORMAL Ⓛ	I	Selects normal or high band. (Unused)
21	POWER SW ON Ⓛ	I	Inputs power switch signal. This signal goes low when the switch is pressed.
22	QD-STROBE	I	Response signal in serial communication with main microcomputer (IC601). Communicable only during "L" period.
23	EJECT SW ON Ⓗ	I	Inputs eject switch signal. Effective even with power turned off so far as the battery is connected.
24	REMOCON	I	Inputs code transmitted from the remote controller.
25	MODE SET SW	I	Inputs signal from the switch which selects title/date setting mode. When pressing the switch once, title mode is selected, and it is changed over to date setting mode when pressing the switch for 3 seconds or longer.
26	SHIFT SW	I	Cursor and setting item are shifted whenever pressing the SHIFT switch in title/date setting mode.
27	NC		OPEN
28	[+]	I	Used for picture search and title character feeding.
29	NC		OPEN
30	[-]	I	Used for picture search and title character returning.
31	——		Connected with ground.
32	X1	O	32 kHz crystal oscillation terminal
33	VCC		Connected with EVER 5 V.
34	X2	I	32 kHz crystal oscillation terminal
35	NC		OPEN
36	NC		OPEN
37	TEST OUT	O	Outputs the signal obtained by dividing clock frequency into 4 in test mode.
38	QD-REQUEST	O	Outputs communication request signal to main microcomputer (IC601). Communicable during "L" period.

Table I-2 (1)

Terminal Functions of QD Microcomputer (continued)

Terminal	Signal designation	I/O	Function
39	START	O	Outputs pulse to release microcomputer from standby mode when Power SW or Eject SW is activated.
40	NC		OPEN
41	TEST Ⓛ	I	"L" for test mode
42	MAIN BATT SET Ⓛ	I	Goes low with main battery mounted.
43	POWER ON Ⓛ	I	Signal for checking power-up. "L" when power is turned on.
44	LITHIUM EMPTY Ⓛ	I	Inputs "L" signal when the terminal voltage of lithium battery is about 2.7 V or less.
45	NC		OPEN
46	TELE Ⓗ	O	Zoom motor control signals. Selection is made according to the zoom switch and remote control signal.
47	WIDE Ⓗ	O	
48	N/H SELECT	O	Normal/high band selection control signal. "H" for normal band. (Unused)
49	REMOCON Ⓛ	O	AF lock signal. Misoperation is prevented by releasing AF on reception of remote control signal.
50	———		Connected with ground.
51	———		
52	———		

Table I-2 (2)

(4) Key inputs

The following mechanism key switches are equipped for giving external requests to the microcomputer or letting the microcomputer recognize the current system status. The microcomputer uses these key inputs when identifying status transition.

① List of Keys at Mechanical Section

	Name	Shape	Internal/ external	Standby cancel function	Switch function
GRIP	POWER	Tact	External	Available	Turns power on/off
	TELE/WIDE	Tact	External	Not avaliable	Power zooming
	TRIG (START/STOP)	Tact	External	Not available	Starts/pauses recording operation.
R-KEY 1	STOP	Tact	External	Not available	Used for stopping.
	PLAY	Tact	External	Not available	Used for playback.
	FF	Tact	External	Not available	For fast forward drive/forward search.
	REW	Tact	External	Not available	For rewind operation/backward search.
	PAUSE/STILL	Tact	External	Not available	Pauses recording or playback.
	REC	Tact	External	Not available	Pauses recording.
	EJECT	Tact	External	Available	For ejection.
R-KEY 2	COUNTER RESET	Tact	External	Not available	Resets the counter.
	TAPE RETURN	Tact	External	Not available	Returns the tape.
	TITLE/DATE	Tact	External	Not available	Selects title or date setting mode.
	SHIFT	Tact	External	Not available	Shifts the cursor.
	PICTURE (+) / SEARCH (-)	Tact	External	Not available	Used for picture search and forward/ backward character feed.
	SELF/INTERVAL	Tact	External	Not available	Selects either timer setting mode.
	SP/LP	Tact	External	Not available	For SP/LP selection.
	REC. REVIEW	Tact	External	Not available	Used for record checking.
	SERVICE 1	Tact	Internal	Not available	Adjusts mechanism drive.
	SERVICE 2	Tact	Internal	Not available	Used for electrical adjustment and operation check.
C-KEY	TITLE	Tact	External	Not available	Turns on/off title.
	DATE	Tact	External	Not available	Selects calendar, date or OFF.
	FADE	Tact	External	Not available	Used for white fading.
	AF/MANUAL	Tact	External	Not available	Selects AF function.
	HIGH SPEED SHUTTER	Tact	External	Not available	Changes over shutter speed.
	AWB/LOCK/SEPIA	Tact	External	Not available	Used for white balance selection and sepia tone setting.
	BACKLIGHT COMP.	Tact	External	Not available	Used for exposure compensation.
MECHA-NISM	SAFETY TAB	Leaf	Internal	Not available	Enables/disables recording on cassette tape.
	CASSETTE DOWN	Leaf	Internal	Not available	Checks if the cassette holder is down.
	MODE	Slide	Internal	Not available	Checks the mechanism status.
	CASSETTE IN	Tape sensor	Internal	Not available	Checks if the cassette tape is loaded or not.

Table I-3

② Key reading

(R-KEY 1, 2)

To reduce the number of microcomputer ports, recorder key uses a single line for reading key information. When switch is pressed, according to the voltage input to the port of microcomputer, the key is judged.

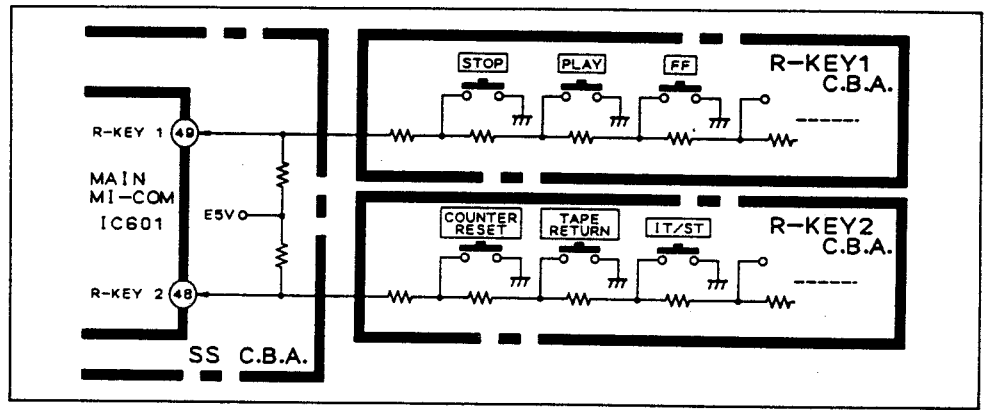


Fig. I-23

(C-KEY)

The camera key microcomputer (IC2701) employs a 3 x 2 key matrix for 6 kinds of switch readings. Read information is transmitted as serial communication data to the main microcomputer. (Table I-4)

(Mechanism mode switches)

Mode switches are provided for indicating the position of mechanisms. The switch code is changed by the loading motor. The main microcomputer reads the mode switch code to detect the position of mechanisms. (Table I-5)

Camera Key Matrix

	C-KEY OUT 1 IC2701-(14)	C-KEY OUT 2 IC2701-(15)
C-KEY IN 1 IC2701-(16)	DATE (SW2702)	AWB/ SEPIA (SW2705)
C-KEY IN 2 IC2701-(17)	AF (SW2703)	FADE (SW2706)
C-KEY IN 2 IC2701-(18)	S. SPEED (SW2704)	TITLE (SW2707)

Table I-4

Switch Codes for Mechanical Section

	M-SW1	M-SW2	M-SW3
EJECT	H	L	L
LOAD/UN-LOAD	H	L	H
STOP	L	L	H
PLAY	L	H	L

Table I-5

Transition of Mechancial Section

	UN-LOAD ←						→ LOAD
MODE SW	EJECT	BLANK 1	LOAD/ UN-LOAD	BLANK 2	STOP	BLANK 3	PLAY
MODE	HOLDER UP/ DOWN		LOAD UN-LOAD		STOP		REC. PB FF.REW CUE.REV

Table I-6

(5) Character display in EVF

This video camera recorder adopts an easy-to-read centralized EVF display system. Besides display of each operation mode and alarm, auto date and title display are available by just one touch.

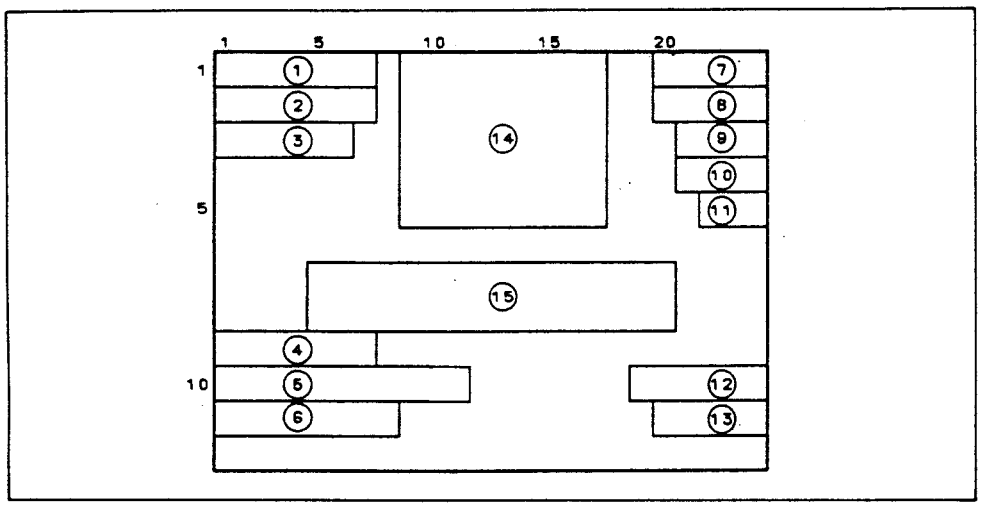


Fig. I-24

*[ ]indicates the SECAM model.

① Focus display
M.FOCUS [MANUEL]

② White balance/
sepia display
WB LOCK [BAL MEM]
SEPIA

③ Electronic shutter display
1/500
1/1000

④ Tape speed display
SP
LP

⑤ Calendar display
23.JAN.1989

⑥ Clock display
12:34 AM

⑦ Tape counter display
-0123

⑧ Tape presense/
end detection display
TAPE [BANDE](Flickers)
T.END [BANDE](Flickers at near end)

⑨ Battery insufficiency alarm
BATT (Flickers)

⑩ Lithium insufficiency alarm
DATE (Flickers)

⑪ Dew condensation alarm
DEW [COND](Flickers)

⑫ Timer mode display
INT 10
INT 20
INT 60
30 SEC (Count)
1 SEC (Count)

⑬ Main unit mode display
REC [ENR]
PLAY [LECT]
STOP
STILL [ARR.I]
PAUSE
FF [AVAN.]
REW [RET.]
EJECT (Flickers)

⑭ Timer setting display
[SELF]
SELF 30
INT 10
INT 60
INT 60

⑮ Title display
ABCDEFGHIJKLMNOP
QRSTUVWXYZ012345

(6) Data communication

① Between IC601 and IC602

Data of 8 bits x 6 words is communicated bidirectionally between IC601 (main microcomputer) and IC602 (QD microcomputer). Because the main microcomputer lacks memory backup system at power failure, important data must be backed up on the QD microcomptuer side. Furthermore, calendar, clock data, etc. are sent from the QD microcomputer to the main microcomputer.

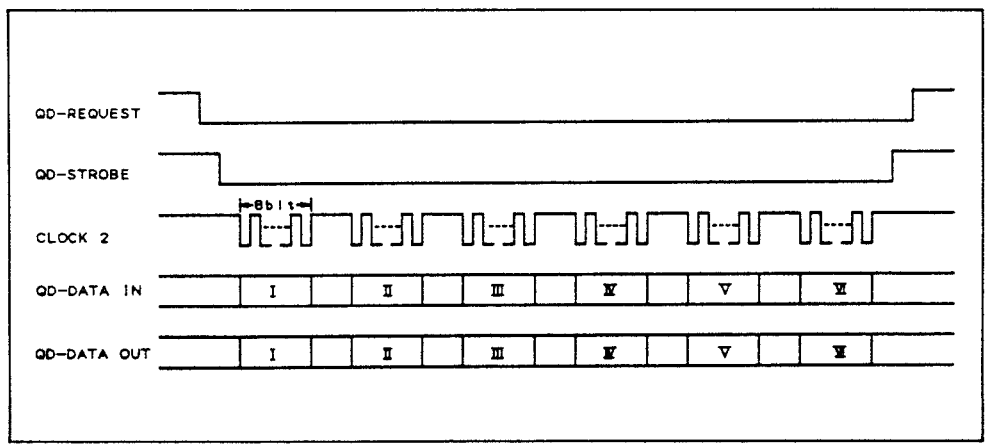


Fig. I-25

1) The QD microcomputer requests the main microcomputer to start serial data communication by making the QD-REQUEST signal at pin 38 to low. Then, the serial data communication is started when the main microcomputer makes the QD-STROBE at pin 12 to low within 17 msec.

2) Eight CLOCK2 pulses are output from pin 39 of the main microcmputer to compelte the exchange of 1 word. In the course of communication, QD-STROBE is always monitored. Just when this signal goes high, the communication is suspended. Normally upon completion of transmitting/receiving 6 words, communication terminates.

3) On termination of 6-words communication, QD-STROBE is checked. When the signal becomes high, the QD-REQUEST signal goes high.

* Data configuration

Data Configuration I (QD → Main Microcomputer)

	D7	D6	D5	D4	D3	D2	D1	D0
1st	Day (1 ∿ 31)					1	0	1
2nd	Year (0 ∿ 15)				Month (1 ∿ 12)			
3rd	(-)	(+)	SHIFT	CHNG	Time (0 ∿ 11)			
4th	AM/PM	Minute(2nd digit)			Minute (1st digit)			
5th	Remote control code (FF unless pressed)							
6th	1	0	1	TAE	LBAT	S/N	EJCT	POWER

Table I-7 (1)

Data Configuration II (QD → Main Microcomputer)

	D7	D6	D5	D4	D3	D2	D1	D0
1st	CG block No. (0 ∿ 7)				+/-	0	0	1
2nd	Tape counter (1000/10)				Tape counter (100/1)			
3rd	CG code #0 (X = 0,1 Y = 0,4,B,C)							
4th	CG codd #1 (X = 0,1 Y = 0,5,9,D)							
5th	CG code #2 (X = 0,1 Y = 0,6,A,E)							
6th	CG code #3 (X = 0,1 Y = 0,7,B,F)							

Table I-7 (2)

[Main to QD microcomputer]

Data Configuration I (Main Microcomputer → QD)

	D7	D6	D5	D4	D3	D2	D1	D0
1st	CG block (Y = 0 ∿ F)				+/-	1	0	1
2nd	Tape counter (1000)				Tape counter (100)			
3rd	Tape counter (10)				Tape counter (1)			
4th	CG code (X = 0)							
5th	CG code (X = 1)							
6th	1	0	1	0	Revision item No.			TADJ

Table I-8 (1)

Data Configuration II (Main Microcomputer → QD)

	D7	D6	D5	D4	D3	D2	D1	D0
1st	CG block No. (0 ∿ 7)				0	0	0	1
2nd	*	*	*	*	*	*	*	*
3rd	*	*	*	*	*	*	*	*
4th	*	*	*	*	*	*	*	*
5th	*	*	*	*	*	*	*	*
6th	1	0	1	0	*	*	*	*

Table I-8 (2)

Upon turning on power supply, data II is communicated for reading out back-up data. Then communication is switched over to data I.

② Between IC601 and IC2701

Between IC601 (main microcomputer) and IC2701 (camera key microcomputer), data of 8 bits x 4 words is exchanged bidirectionally. Camera key information is transmitted to the main microcomputer for various processing purposes. On the other hand, the main microcomputer outputs reset signal to reset the camera key microcomputer.

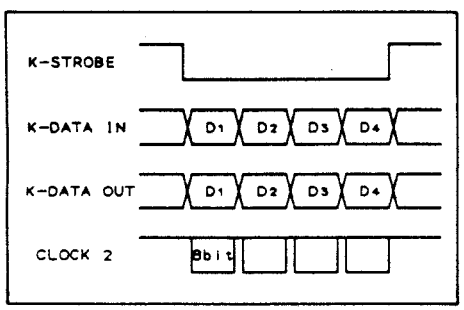


Fig. I-26

Data Configuration I (Camera → Main Microcomputer)

	7	6	5	4	3	2	1	0
D_1	*	*	TITLE	*	0	1	0	1
D_2	W.BL	SEPIA	1/500	1/1000	AF	REC.R	FADE	DATE
D_3	*	*	*	*	*	*	*	*
D_4	1	0	1	0	*	*	*	*

Table I-9 (1)

Data Configuration II (Main Microcomptuer → Camera)

	7	6	5	4	3	2	1	1
D_1	0	0	0	0	0	1	0	1
D_2	0	0	0	0	0	0	REC.R	RESET
D_3	0	0	0	0	0	0	0	0
D_4	1	0	1	0	0	0	0	0

Table I-9 (2)

1) K-STROBE signal is output from pin 11 of the main microcomputer. Data is transmitted in the "L" period.

2) Data D_1 to D_4 are transmitted in synchronization with the CLOCK1 signal appearing at pin 39 of the main microcomputer to terminate communication. At this moment, the K-STROBE signal goes high.

③ Video character data communication

IC601 (main microcomputer) also outputs mode data, character data, etc. to each IC. This microcomputer communicates with 2 ICs; IC105 (video IC) and IC2941 (character IC).
All data are communicated over a single line. According to each strobe signal, data is input to each IC. Clock signal is also used in common. At its falling end, output data is set, and it is input at the rising edge.

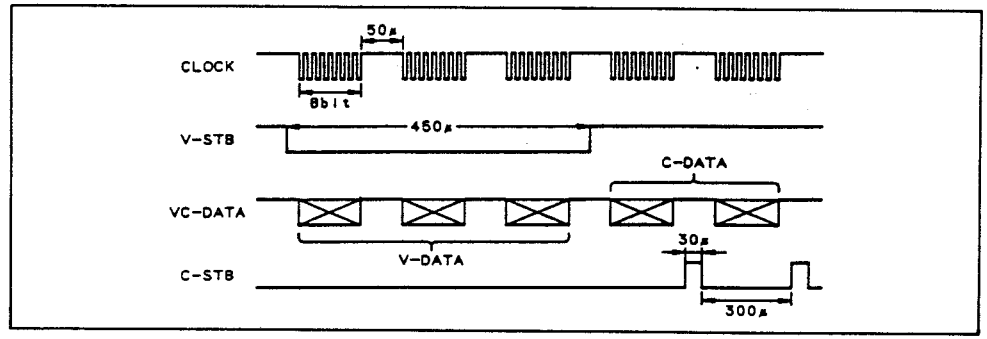


Fig. I-27

* V-DATA transmission

VC-DATA, generated at pin 42 of the main microcomputer. The remaining serial data is sent from pin 22 to pin 19 of video IC105.
V-DATA is transmitted only when any change occurs in the contents of data.

Data Configuration (Main Microcomputer → Video)

DATA / MODE		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP		H	L	L	H	H	L	H	L	L	H	H	L	H	L	L	L
PLAY	SP	H	H	H	H	L	L	H	L	H	L	H	L	H	L	L	H
	LP	H	H	H	H	L	L	L	H	H	H	H	L	H	L	L	H
CUE		H	H	H	H	L	L	L	L	L	H	H	L	H	H	H	H
REV		H	H	H	H	L	L	L	L	L	H	H	L	H	H	H	H
STILL		H	H	H	H	L	L	L	L	L	H	H	L	H	H	H	H
FF		H	L	L	H	H	L	H	L	L	H	H	L	H	L	L	L
REW		H	L	L	H	H	L	H	L	L	H	H	L	H	L	L	L
REC		H	L	L	H	H	L	H	L	L	H	H	L	H	L	L	L
REC.P		H	L	L	H	H	L	H	L	L	H	H	L	H	L	L	L

Table I-10

* C-DATA transmission

C-DATA is transmitted over the VC-DATA line which connects output from pin 42 of the main microcomputer. Upon completion of transmitting each 8-bit data, only the data, for which C-STROBE signal is transmitted, is read as C-DATA at IC2941-1 pin.

(7) Safety mechanisms

Alarm display, restrictions on acceptance of key entry and operation, etc. are provided for preventing mechanical damage or tape jamming due to abnormal state of the recorder.

① Detection of battery voltage drop

Battery voltage drop is detected in an independent circuit for each of the main and lithium batteries.

* Main battery
The drop of main battery voltage is detected in three stages as follows.

(UNDER CUT1)
When the battery terminal voltage drops to 5.75 V or less, it is detected as a voltage drop. LED at top of the main unit flashes and "BATT" appears in EVF for warning.
In this stage, input keys and operations are not regulated, so VCR is operated normally.
When voltage in the 6 V line drops below the specified level, the drop detection voltage input to pin 44 of the main microcomputer also goes low. This is judged as UNDER CUT1 status in that microcomputer. Subsequently, the microcomputer flashes LED through feeding signal to pin 14 and brings about alarm display in EVF via the VC-DATA signal output at pin 42.

(UDNER CUT2)
When the battery terminal voltage further drops to 5.55 V or less, it is set to STOP mode automatically and power is turned off.
Voltage drop is detected in the main microcomputer as in UNDER CUT1. The microcomputer activates the loading motor, shifts mechanism to the stop position, and then turns off each power supply control signal.

(Shut-off)
When the battery voltage drops to 4.5 V or less suddenly, the reset IC606 is activated to reset the main microcomputer and turn off power supply immediately.

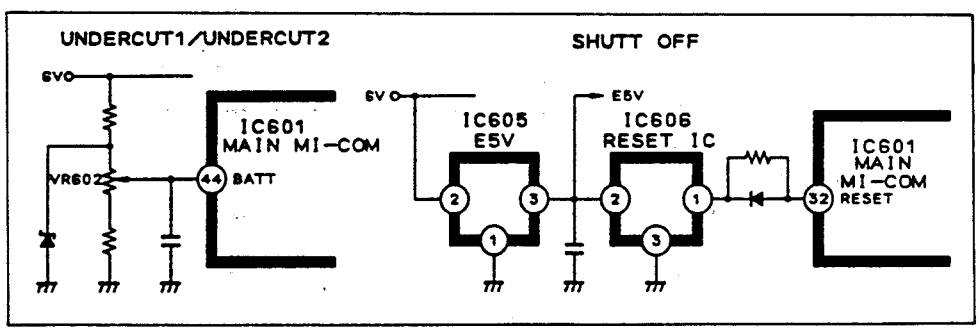


Fig. I-28

* Lithium battery
When the lithium battery thermal voltage falls to 2.7 V or less, the comparator output of IC607 goes low to warn the main microcomputer of voltage drop.
The main microcomputer blinks "DATE" display in EVF.

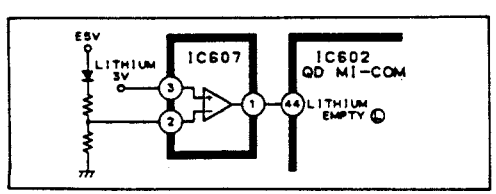


Fig. I-29

② Dew condensation

This VCR incorporates the function for detecting dew condensation in order to prevent tape jamming due to sticking, etc.
If condensation is detected during operation, the mechanism performs DEW EJECT action and transition is made up to the unload/cassette-in status. At this stage, only the POWER and EJECT switches are effective. Even after removal of dew condensation, other key inputs are not accetable only after power is turned off or the cassette is ejected. Loading is not implemented even when inserting a cassette while condensation remains.
As an alarm, the LED at the top of main unit, and "DEW" and "EJECT" display in EVF both flicker.
Under condensation, the DEW sensor on the recorder mechanism chassis increases its resistance and pin 45 of the main microcomputer receives an increased DEW detection voltage. Upon rise beyond a certain specified level, the microcomputer judges that condensation has occurred, and triggers mode transition and alarm display as above.

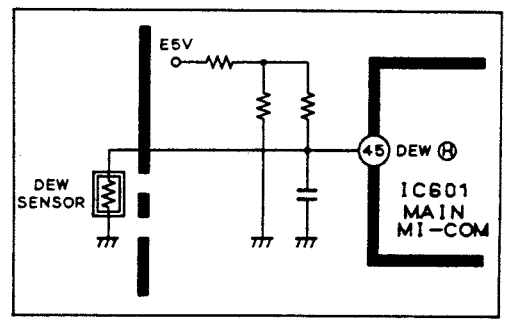


Fig. I-30

[DEW EJECT]
Once tape has adhered to the head drum, the takeup reel alone is inadequate for rewinding the tape. So the supply reel must also be used for rewinding. For this purpose, the DEW EJECT sequence is effected as illustrated below in the event of dew condensation.

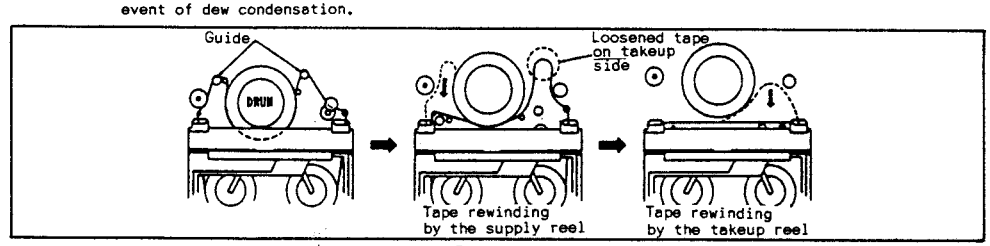


Fig. I-31

③ End-of-tape check

If the tape is run even after reaching its end, it may cause damage on the tape guide or squeezing on the head drum. To prevent this, the end-of-tape check function is provided in the system.
When the end of tape is detected, the tape drive is forced to stop immediately.
The tape end detection LED is turned on/off according to the signal from pin 27 of the main microcomputer IC601. It always flickers at intervals of 1 msec.
When the END SENS signals at pins 19 and 20 go low twice successively, the microcomputer judges that the end of tape is reached and it causes the mechanisms to stop.
Also, when the EOT and BOT input signals become low twice successively at the same time, the microcomputer judges that the cassette is not loaded and it makes "TAPE" display blink in the EVF.

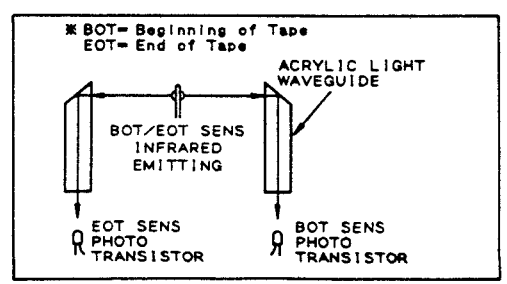


Fig. I-32

④ Pause timer

In the REC PAUSE or STILL mode, the head drum rotates with the tape traveling around it. If this condition persists for a certain period of time, it may cause tape abrasion or head clogging. To prevent this, the STOP position is taken to turn power off after a lapse of seven minutes in the REC PAUSE mode. In the STILL mode, just the STOP position is taken.

⑤ Trouble stop (error)

When the main microcomputer (IC601) detects an error, the unload mode is set. Thereafter, only the POWER and EJECT switches become effective. For alarm display, the LED at the top of the main unit and "EJECT" display in the EVF both flicker.

Content/Detection of Trouble Stops

Kinds of trouble stop	Contents	Method of detection
Drum error	Deviation from specified speed by $^{+1\%}_{-50\%}$ or more (continuously for 2 sec or longer)	D-FG signal input to pin 61 of IC601
Capstan error	Deviation from specified speed by ±20% or more (continuously for 2 sec or longer)	C-FG signal input to pin 62 of IC601
Reel error	Reel does not turn. (8 sec or longer at playback 8/each fast-speed sec for other modes)	Reel FG input to pins 46 and 47 of IC601 (T reel for forward feed and S reel for backward feed)
Loading motor/safety timer	Mode transition is not completed within determined time period (pinch roller pressing 2 sec and other 8 sec).	Timer in IC601 and mode switch input to pins 24 to 26

Table I-11

The service mode signifies a function for reporting the cause of trouble stop if an error occurs. This function is activated by using the service switch on the R-KEY 2 circuit board or shorting the remote control service pattern. For details, refer to "(8) Other functions ⑥" explained below.

(8) Other functions

① Tape counter

The main microcomputer (IC601) counts reel FG and transmits it to the character IC (IC2941) via data communication for counter display in the EVF.
In actual operation, supply and takeup reel FG signals input to microcomputer pins 46 and 47 are counted and then mixed. Whenever counted 5 times internally, the tape counter advances by 1.

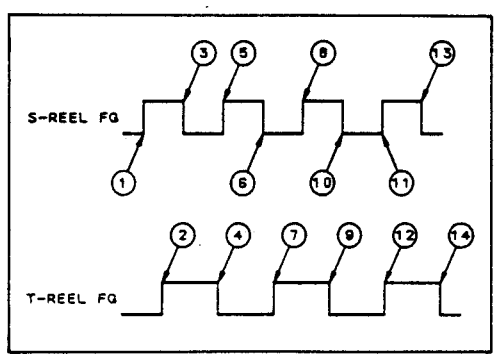


Fig. I-33

② Rec review

When pressing the REC REVIEW button with recording at pause, rec review mode is assumed in which recorded portion is confirmable for about 3 sec as detailed below.
On pressing the REC REVIEW button, the tape is played back backward for approx. 3 sec, it is played back forward up to the original location and recording pause status returns. During this time period, the video circuit is set in the JOG mode to insert JOG VD, but audio signal is not output since it is muted.

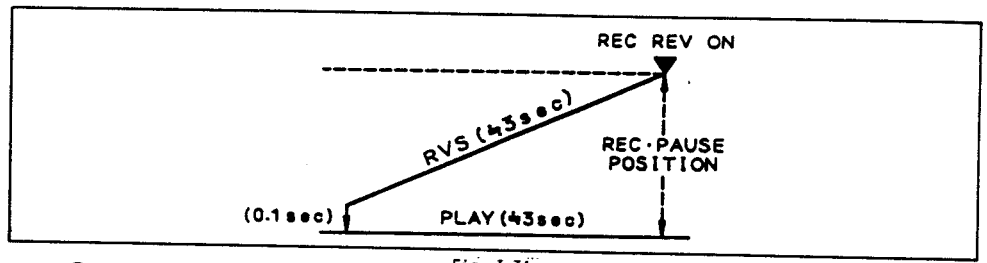


Fig. I-34

③ Edit recording

Edit recording mechanism functions to prevent occurrence of unrecorded portion and tracking error on restart of recording by the start key after its pause. Operational sequence of REC → REC·PAUSE → REC is explained below.

1) In case trigger is accepted in the REC mode, it is canceled just when the REF PILOT signal becomes f_3 and reversing brake is applied.

2) After about 0.3 sec, the capstan motor starts in the reverse direction to rewind the tape. On this occasion, the tape is moved 3 times as fast as the normal speed.

3) The tape is run for approx. 1.3 sec and then brake is applied again.

4) Next the tape is transported forward at a threefold speed for approx. 0.6 sec. In this way, the reel pendulum gear is pressed against the takeup reel from the supply reel, thereby preventing the tape from inching and curbing the rise time after releasing pause.

5) Brake is applied again to fetch the REC PAUSE status.

6) When trigger is accepted in this status, the capstan motor turns on, the tape is run in the playback mode and the ATF servo is activated.

7) At about 0.7 sec after start of the capstan motor, recording starts from the field f_3 of ATF.

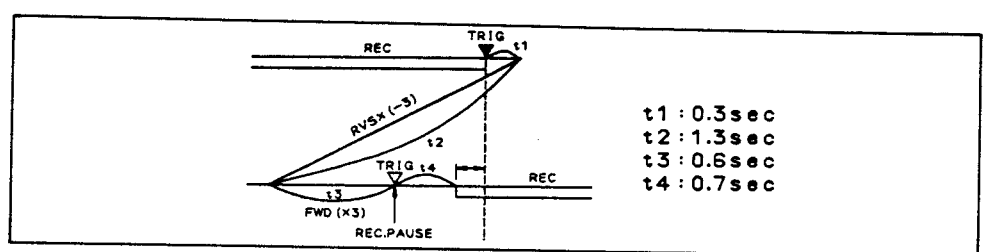


Fig. I-35

④ Full top loading

This VCR effects a special loading on detection of the beginning of tape in the cassette introduced in order to prevent riding onto the drum when loading the beginning of tape.
At start of the drum, it is reversed for about 1 sec. Then, the slight brake is applied for the half-loading. By this function, the tape riding can be prevented. (The claw at the upper drum makes the tape off.)

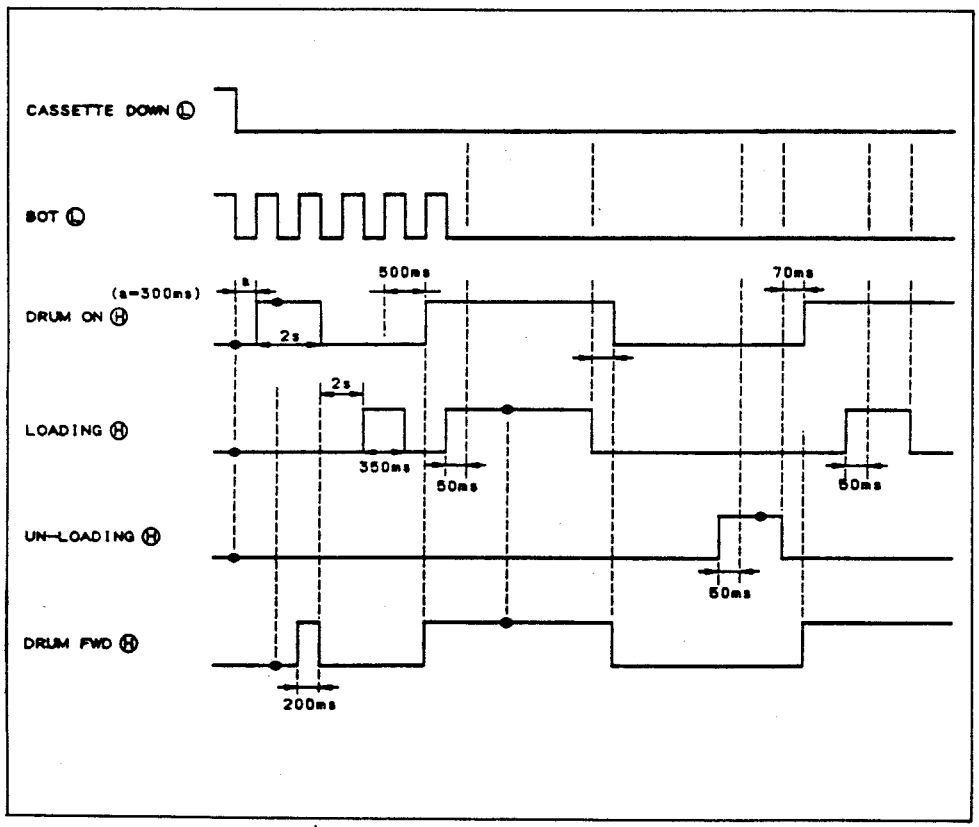


Fig. I-36

⑤ Head Switching in Recording (CT C.B.A.)

In foregoing E70 and E708, the winding angle of the tape to the drum is 180° and the signals are applied to both CH-1 and CH-2 in recording mode without head switching.
In E80, the winding angle is changed to 221°, and in recording mode, the head switching is carried out by SW PULSE 1 and 2.

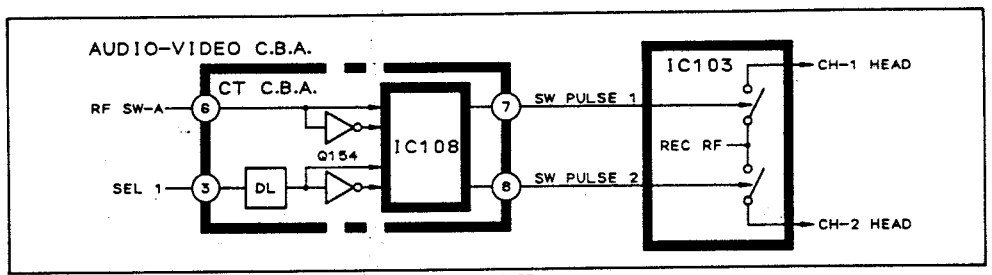


Fig. I-37

The SW PULSE 1 and 2 are generated from the RF SW-A and SEL1. By IC108 and Q154, the ON period of each switch is lengthened according to the time constants determined by R340 and C320 (approx. 3H in front portion).

The Fig. I-38 shows the generating operation for SW PULSE 1 and 2. When the REC SW CONT goes low in recording mode, the SW PULSE 1 and 2 go low to turn the both switches on.
In playback mode, as the PB high signal is applied, the SW PULSE 1 and 2 go high to stop the switches off.

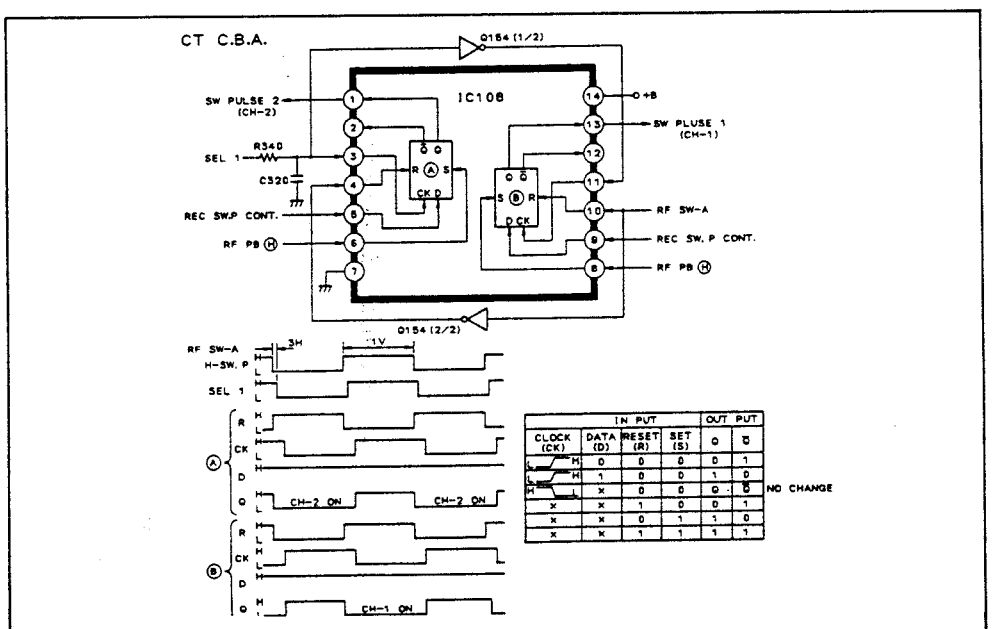


Fig. I-38

⑥ Service modes for recorder unit

This an additional function for facilitating adjustments/repair of recorder unit. With this mode, the recorder unit can be adjusted/repaired independently.

1) How to set service mode?

To set the service mode from the usual operation mode, there are two ways as below.

* Modes are shifted sequentially as listed below by pressing the internal switch on the R-KEY board.

How to Set Service Mode?

Service switch	SERVICE 1	SERVICE 2
Press once	1-01	2-01
Press twice	1-02	2-02
Press 3 times	Normal	2-03
Press 4 times	1-01	2-04
Press 5 times	1-02	Normal

Table I-12

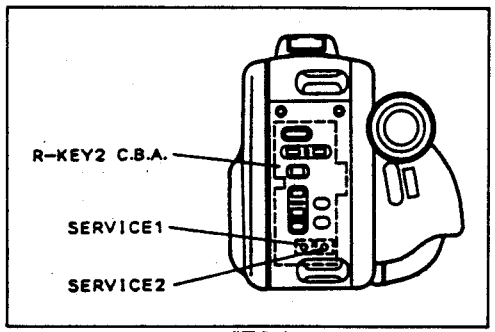


Fig. I-39

* SERVICE 2 mode is settable by short-circuiting the pattern of remote controller (WL-E80EXP). This allows operation check without disassembling the main unit.
(Remote Controller WL-E80EXP is supplied as service part. DY2-6014-000)

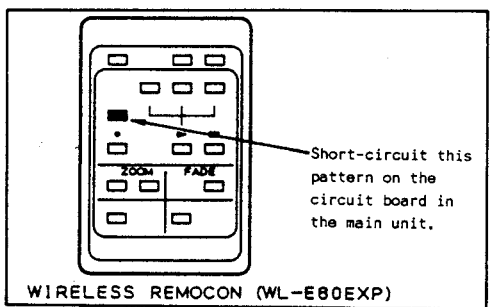


Fig. I-40

2) Service mode functions

[Service mode 1]

Used for adjustment and check of tape traveling section.
Duty of head switching pulse is varied so as to make confirmable the inlet and outlet sides of RF envelope.

Functions of Service Mode 1

Mode	Description	Display	Application
SERVICE 1-01	Tracking level reduced by 30%	POWER LED flickers at 0.5 sec intervals.	Tracks can be shifted. Slight adjustment in mechanism driving possible.
SERVICE 1-02	Tracking level at 100%	POWER LED flickers at 1 sec intervals.	Inlet/Outlet of envelope at on-track status confirmable

Table I-13

[Service mode 2]

Used for electrical adjustment, analysis of trouble stops, check of each sensor and key, etc.

SERVICE 2-01

Enables UNDER CUT and ATF BIAS adjustments.

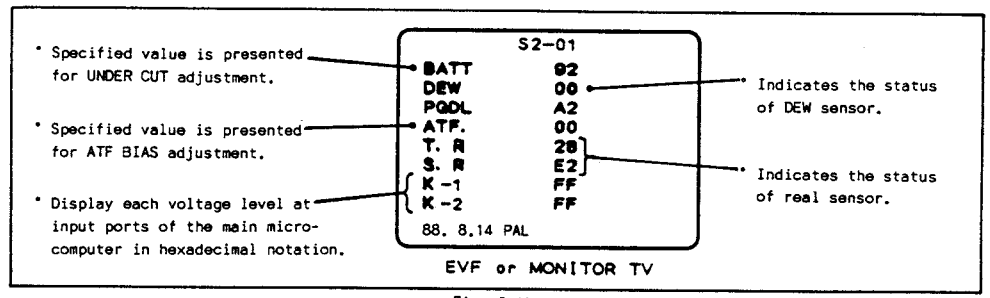


Fig. I-41

SERVICE 2-02

Permits analysis of trouble stops and check of each sensor.

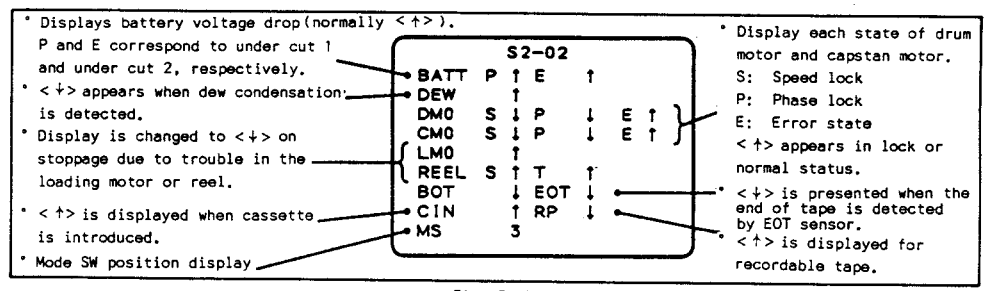


Fig. I-42

SERVICE 2-03

Allows checking the acceptance of recorder key and remote control signals.

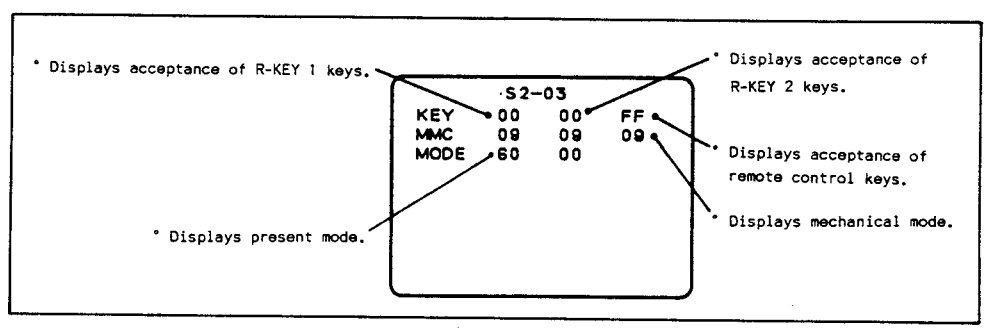


Fig. I-43

SERVICE 2-04

With this mode, the detecting functions below can be canceled.
* Drum rotation error
* Capstan rotation error
* Reel rotation error

(9) Wireless remote controller

The wireless remote controller (WL-E80) has been developed so as to control the E80 remotely.

① Specifications

System	:	Infrared-ray wireless controller
Data transmission	:	With infrared-ray pulse (tuning frequency 37.9 kHz)
No. of operation button	:	14 buttons
Working distance	:	Approx. 5 m
Workable range	:	Approx. 30° horiozntally and approx. 15° vertically
Dimensions	:	135 x 58 x 15 mm (L x W x T)
Weight	:	55 g (approx.)
Battery used	:	2 size-AAA batteries

② Function

The code to be transmitted consists of a leader section, custom code (16 bits) and data code (16 bits), which is decoded by microcomputer to accept each operation key.
In case any key is pressed doubly, data transmission is prohibited to prevent misoperation.
[DISPLAY] and [FADE START/STOP] key functions of this controller are unavailable on the main unit.

* [Display] key

Tape counting and mode display are made via line OUT in other than camera recording and line input.

* [Fade start/stop] key

Operable only in usual camera recording mode.
Fading proceeds at the timing as shown in the Fig. I-44.

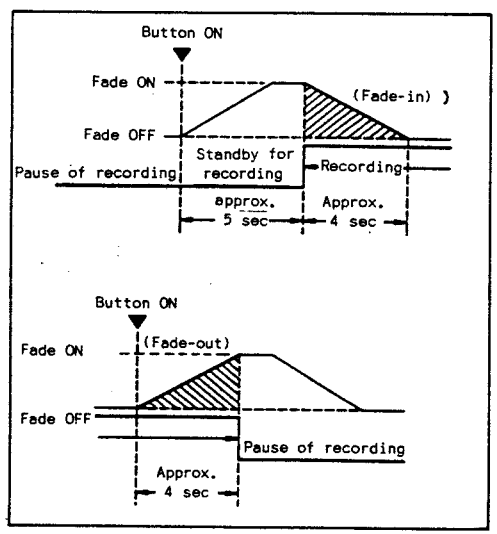


Fig. I-44

(10) Transition of each mode

Transition of Each Mode (Recorder Section)

MODE / KEY	P-OFF	REC-PAUSE								REC			REC-REV	STOP	PLAY	FF	REW	STILL
		NORMAL	SELF1-P.	SELF2-P.	INT10-P.	INT20-P.	INT60-P.	SELF-CD	INT-OPE	NORMAL	SELF-REC	INT-REC						
POWER	R-PAUSE	P-OFF*1	P-OFF*1	P-OFF*1	P-OFF*1	P-OFF*1	P-OFF*1	P-OFF*1	P-OFF*1	P-OFF*1	P-OFF*2	P-OFF*2	P-OFF*3	P-OFF	P-OFF*4	P-OFF*4	P-OFF*4	P-OFF*5
EJECT	EJECT	EJECT	EJECT	EJECT	EJECT	EJECT	EJECT	X	X	X	X	X	X	EJECT	EJECT	EJECT	EJECT	EJECT
TRIGER	X	REC	SELF1 CD REC	SELF2 CD 30sec.REC	INT-REC	INT-REC	INT-REC	R-PAUSE	R-PAUSE	R-PAUSE	R-PAUSE	R-PAUSE	X	X	STILL	X	X	PLAY
REC-REV	X	REC-REV	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SELF/INT	X	SELF1-P.	R-PAUSE	R-PAUSE	R-PAUSE	R-PAUSE	R-PAUSE	X	X	X	X	X	X	X	X	X	X	X
REC	X	X	X	X	X	X	X	X	X	X	X	X	X	R-PAUSE	X	X	X	R-PAUSE
STOP	X	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP	X	STOP	STOP	STOP	STOP
PLAY	X	X	X	X	X	X	X	X	X	X	X	X	X	PLAY	X	PLAY	PLAY	PLAY
FF	X	X	X	X	X	X	X	X	X	X	X	X	X	FF	CUE*6	CUE*10	FF	CUE*8
REW	X	X	X	X	X	X	X	X	X	X	X	X	X	REW	REW*7	REW	REV*11	REV*9
STIL/PAUSE	X	REC	SELF1 CD REC	SELF2 CD 30sec.REC	INT-REC	INT-REC	INT-REC	R-PAUSE	R-PAUSE	R-PAUSE	R-PAUSE	R-PAUSE	X	X	STILL	X	X	PLAY

Table I-14(1)

SELF1: SELF, SELF2: SELF 30, INT10: INT. 10, INT20: INT. 20, INT60: INT. 60.
SELF-CD: Self-timer is working (count-down).
INT-OPE: Interval timer is working.
*1: Power off after movement to stop position *2: Power off at stop position after short winding
*3: power off at stop position after completion of rec review *4: Power off at stop position
*5: Power off at stop position after short rewinding
*6: Cue operation while FF button is pressed. Playback upon releasing the button.
*7: REV while REW button is pressed. Playback on releasing the button.
*8: CUE while FF button is pressed. Playback of still frame picture when releasing the button.
*9: REV while REW button is pressed. Playback of still frame picture when releasing the button.
*10: CUE while FF button is pressed. FF when releasing the button.
*11: REV while REW button is pressed. REW when releasing the button.

Transition of Each Mode (Other than Recorder Section)

MODE / KEY	P-OFF	PEC-PAUSE								REC			REC-REV	STOP	PLAY	FF	REW	STILL
		NORMAL	SELF1-P.	SELF2-P.	INT10-P.	INT20-P.	INT60-P.	SELF-CD	INT-OPE.	NORMAL	SELF-REC	INT-OPE.						
TITLE	X	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	X
DATE	X	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	X
FADE	X	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	X
FOCUS	X	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	X
AWB/SEPIA	X	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	X
BLC	X	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	X
SHUTTER	X	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	X
T.RETURN	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X
C.RESET	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
SP/LP	X	O	O	O	O	O	O	X	X	X	X	X	X	O	X	O	O	X
TITLE /DATE	X	O	X	X	X	X	X	X	X	X	X	X	X	O	X	O	O	X
SHIFT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
+	X	REC-PLAY	SELF2-P.	INT10-P.	INT20-P.	INT60-P.	SELF1-P.	X	X	X	X	X	X	X	X	X	X	X
-	X	REC-RVS	INT60-P.	SELF1-P.	SELF2-P.	INT10-P.	INT20-P.	X	X	X	X	X	X	X	X	X	X	X

Table I-14(2)

2-3-2 Servo Circuit

The servo circuit is composed of the drum/capstan FG sensor amplifier section, drum/capstan servo section, drum motor driver section, capstan motor driver section and ATF servo section.
Operation of each section is outlined below.

(1) Drum/capstan FG sensor amplifier section

FG and PG micro outputs detected through the drum motor and capstan motor, and amplified and waveform-shaped to obtain a logical level (0 to 5 V), which is fed to the drum and capstan servo section.
Processing is made in the motor sensor amplifier IC of IC412. Capstan FG frequency is 1325 HZ (SP), 663 Hz (LP) and the drum FG frequency approximates 600 Hz. Because the drum PG is normalized according the rise-point signal of drum FG, operationally two PG pulses are present at an interval of 40 msec from the first rise point of drum FG to the next one.

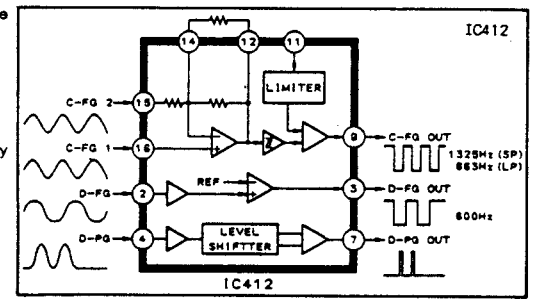


Fig. I-45

(2) Drum/capstan servo section

Main microcomputer takes full charge of servo control. So an external servo circuit is not provided in particular. The hardware of servo system is comprised in IC for software servo implementation.

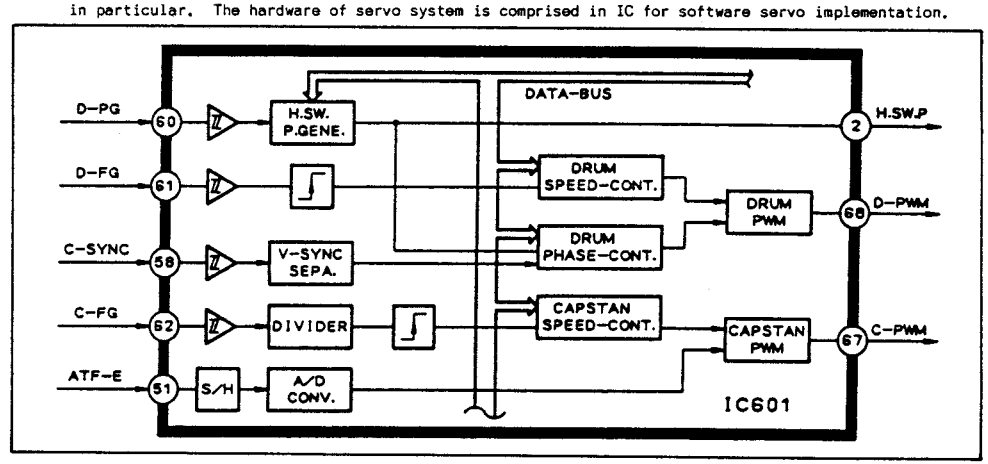


Fig. I-46

* Drum servo system

The drum servo is composed of speed servo and pahse servo.
In case of the drum speed servo, FRC is sampled at the rising edge of drum FG applied from pin 61 to calcualte an error quantity, which is internally corrected for control.
The drum phase servo depends on the detection of phase differnce between the reference signal and drum PG. At playback, 50 Hz signal counted down from clock is used as a reference, and V-SYNC separated from the C-SYNC signal fed to pin 58 is employed at recording.
A free running counter is basically utilized for FG and PG measurement, and error quantity is computed from the difference between the sampling period and internal reference.

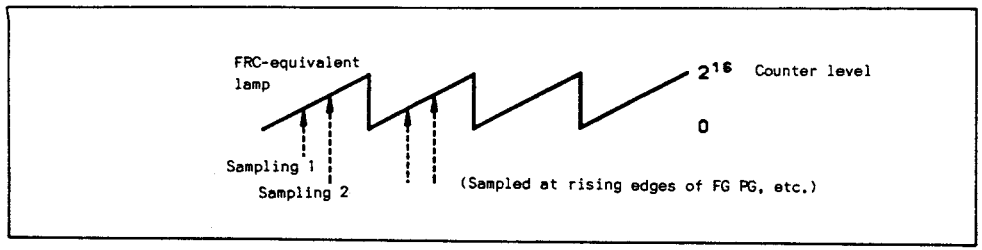


Fig. I-47

* Capstan servo system

This system effects control so that ATF servo is applied at playback and that constant 1325 Hz (SP), 663 Hz (LP) rotation is obtainable at recording.
FRC is sampled at the rising edge of capstan FG applied from pin 62 to calculate error quantity, which is subjected to internal correction for controlling the capstan speed. Although the conventional system is equipped with a VR for capstan free speed adjustment, E80 is capable of automatic adjustment.

* Drum f_H correction and capstan speed correction

In CUE and REV modes, tape run is different from that in the normal playback mode (9x speed in CUE and -7x speed in REV). To maintain horizontal synchronization, therefore, drum speed is adjusted by 5% (SP), 3% (LP) approx. Although E80 does not incorporate an external correction circuit such as provided with the conventional system, it is able to achieve correction easily just by altering the internal reference.
Capstan also undergoes speed correction by means of switchover of the internal frequency demultiplier and alteration of the reference.

* PWM output

Each of drum servo and capstan servo control signals is finally output as PWM signal via pins 67 and 68 of main microcomputer 601. And it is integrated in the integration circuit to generate a DC voltage for motor control as illustrated below.

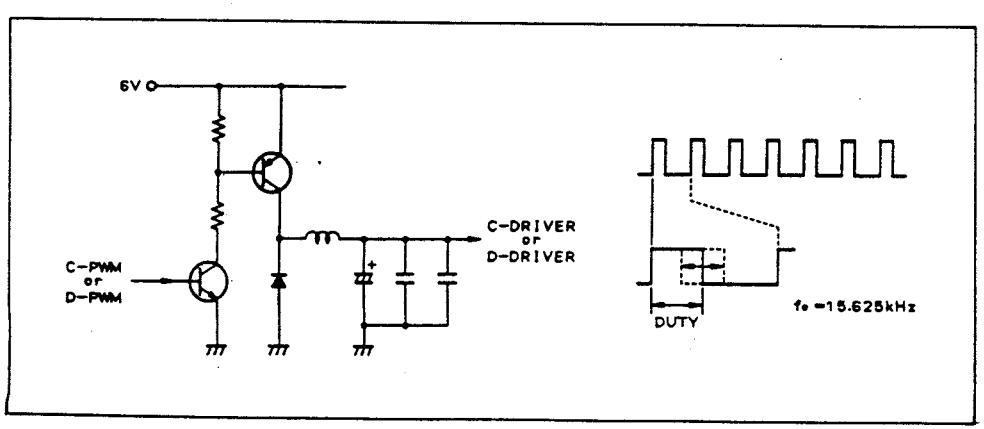


Fig. I-48

(3) Drum motor driver section

The drum motor driver (IC431) is controlled according to PWM power drive output so that the sensorless drum motor is subjected to switching drive. The drum motor is a 3-phase brushless motor which allows energization in only one way.

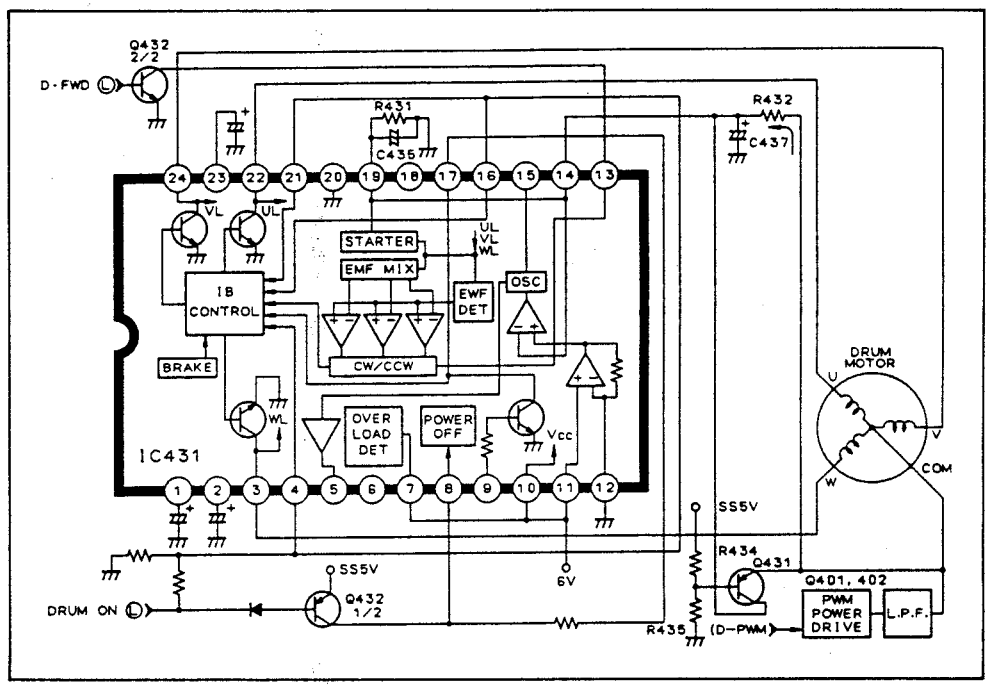


Fig. I-49

The D-PWM signal output from pin 68 of main microcomputer (IC601) receives power drive in Q401 and 402. Then it passes through LPF so as to be converted into a DC voltage and then it is added to the common terminal of drum motor.
Switching among phase W, U and V of drum motor uses pins 3, 22, and 24 of IC431, respectively.
Timing of this switching depends on the detection of motor counter-electromotive voltage via pin 14.
Motor drive is controlled in response to DRUM ON (L) signal from the main microcomputer. Brake is stopped by using pin termfinals 4, 13 and 21 of IC431.

(4) Capstan motor driver section

This section consists primarily of capstan motor driver (IC411). To siwtch the drive of the motor, the positional detection with a Hall element is carried out by using the PWM power drive output as a control signal. The capstan motor is a 3-phase brushless motor which allows energization in only one direction.

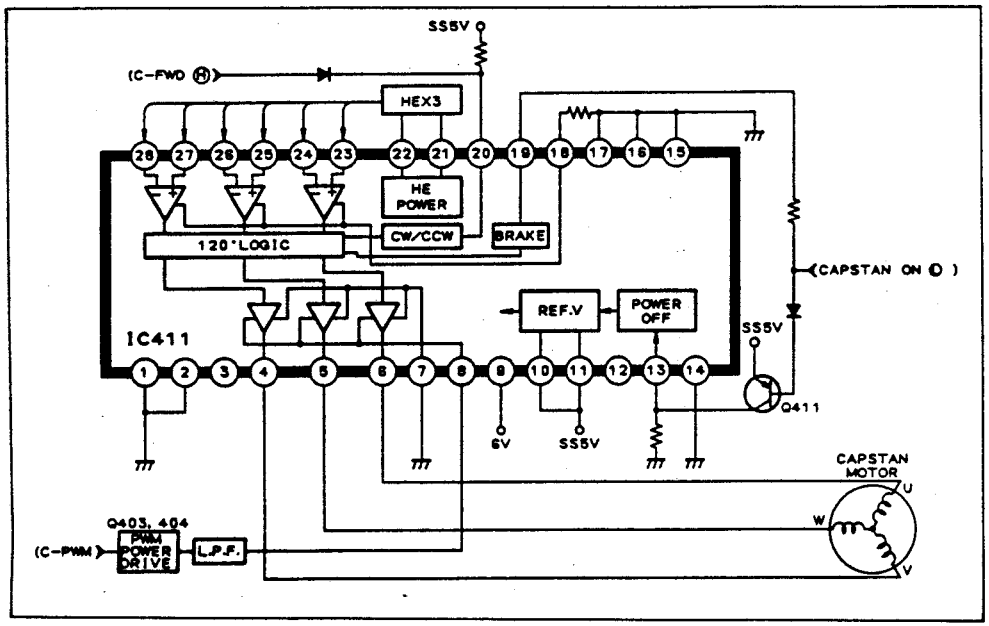


Fig. I-50

The C-PWM signal output from pin 67 of main microcomputer (IC601) is amplified its voltage at Q403 and 404. Then it is covnerted into a DC voltage through the LPF and fed to pin 8 of IC411, and the voltage is supplied for U, V and W phases. At stoppage, brake is applied by setting pin 19 of IC411 to high.

(5) ATF servo section

ATF servo section is operated by use of IC441 (ATF IC). The ATF pilot signal frequency-multiplexed together with video signal is reproduced to generate capstan phase error signal. This error signal is delivered to the main microcomputer IC601 and mixed with the speed servo, then is output as a PWM signal.

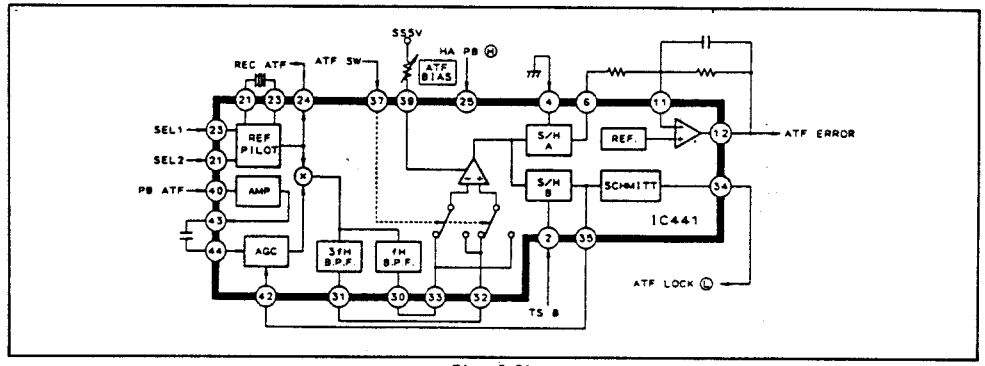


Fig. I-51

* Recording mode

In recording, the reference signal 375 f_H in the IC is frequency-divided to generate the REF PILOT signal. Output from pin 24 varies within f_1 to f_4 through combination of SEL 1 and SEL 2 signals applied to pins 21 and 23 of IC441.
On this occasion, ATF error output at pin terminal 12 is fixed to about 2.6 V DC.

SEL 1	SEL 2	1/N	ATF OUT
H	H	1/58	f_1 (6.5f_H)
L	H	1/50	f_2 (7.5f_H)
H	L	1/36	f_3 (10.5f_H)
L	L	1/40	f_4 (9.5f_H)

Table I-16

* Playback mode

At the time of playback, the PB ATF signal fed to pin 40 of IC441 is balance-modulated with the REF PILOT signal generated as in recording. Next, f_H and $3f_H$ components extracted by BPF are compared to detect lead or delay ATF error. The detected signal is transmitted from pin 12 and sampled/held in the main microcomputer.
Comparator output signal is also fed to the S/H B circuit for back lock detection. During the TS B sampling period (Ⓛ period), lock detection is made by using the REF PILOT signal before 1 field. Ⓛ signal in normal status or Ⓗ signal in back lock is sent to the main microcomputer. In case back lock is confirmed, SEL 1 and SEL 2 signals are controlled so as to advance the REF PILOT signal by 2 fields and thereby shorten the phase error correction time.

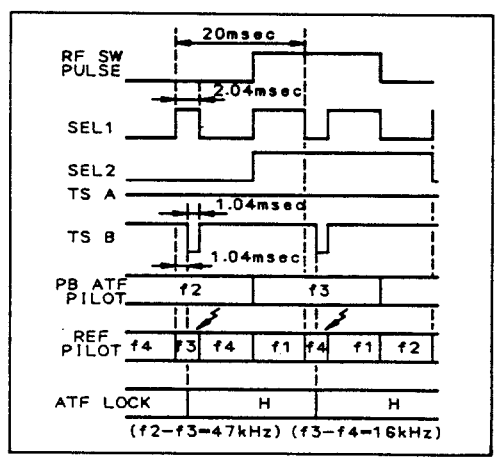


Fig. I-52

* CUE and REV modes

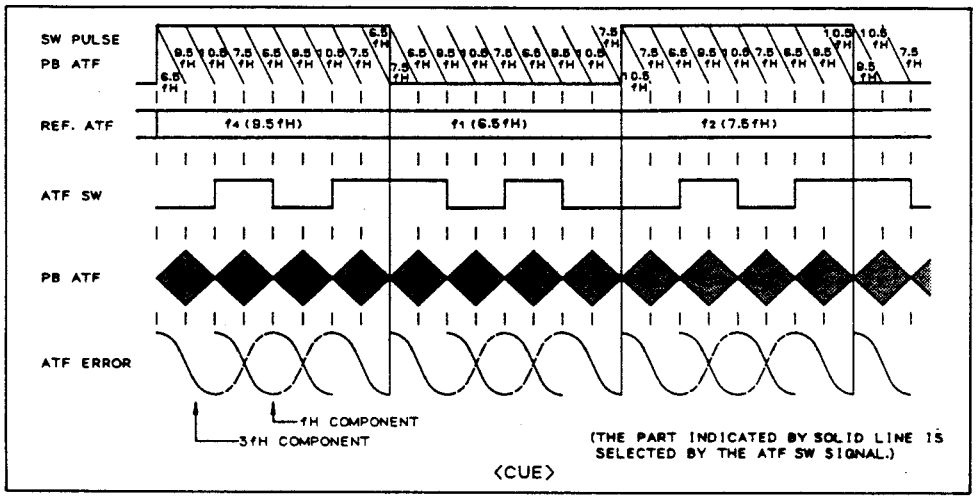


Fig. I-53

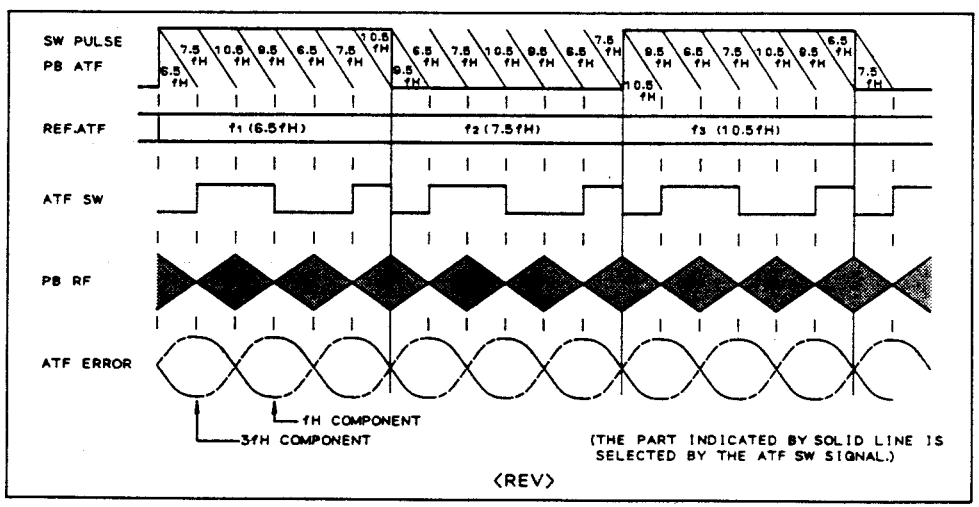


Fig. I-54

In the CUE/REV mode, ATF switch timing is varied so that phase is controlled in response to ATF error which appear in the entire field. This fixes noise bar.

2-3-3 Video Circuit

To process signals, the recorder has heretofore employed different C.B.A.s for the video signal, audio signal and head amplifier. In case of E80, all these cards are integrated to a siNGLE AUDIO VIDEO CBA owing to miniaturization of ICs and chip parts.

(1) Recording

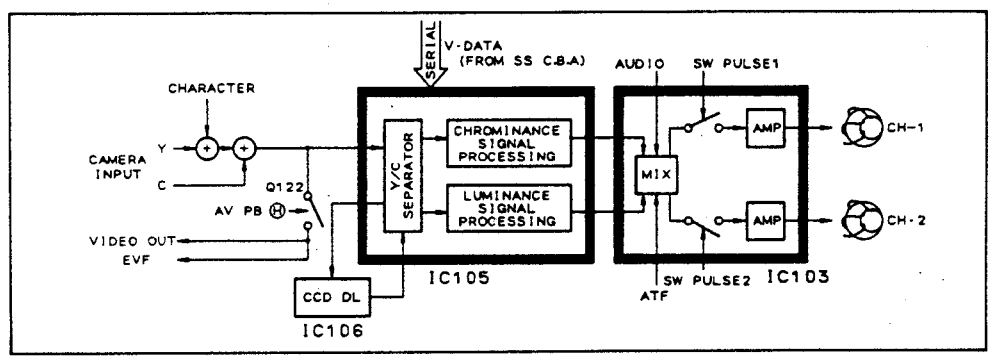


Fig. I-55

Firstly, signals from the camera are mixed in the YC mix circuit for Y/C-separated input. Then The signal is subjected to Y/C separation and modulation in ICs 105 and 106, and then sent to IC103 (recording amplifier).

The output from IC105 is mixed with the recording signals in IC103, and the subsequent switch distinguishes recording between channels 1 and 2 for recording on tape.

① Luminance signal circuit

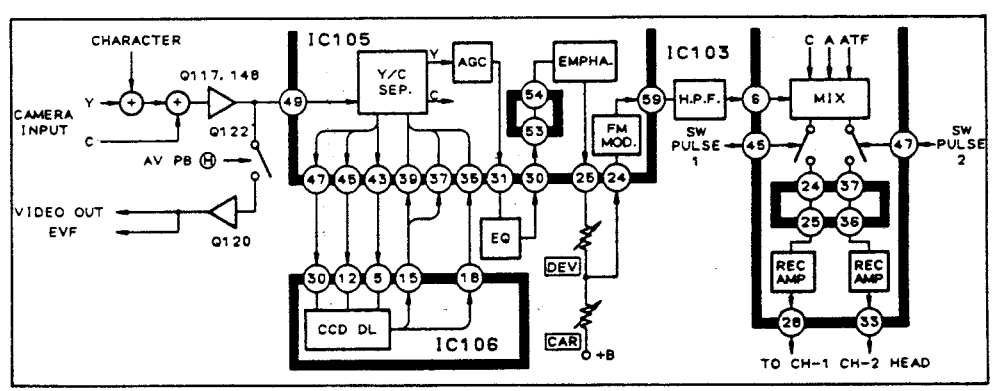


Fig. I-56

Character signal is mixed with the luminance signal from the camera Y/C separator, then, it is mixed with the chrominance signal.

Then the signal is applied to ICs 105 and 106 which composes a Y/C separation circuit with IC105, and it is separated into luminance and chrominance signals.
The separated luminance signal passes through the AGC circuit in order to suppress level change in Y/C separation. Its intermediate/low-frequency band is amplified in the equalizer circuit and then subjected to emphasis. The emphasized signal is frequency-modulated and output from IC105.
From the signal, chroma and audio signal band is eliminated through HPF and then input to IC103. In this IC, the luminance signal is mixed with chrominance, audio and ATF signals. The mixed signal is fed to REC-AMP and output from IC103 for recording.

② Chrominance signal circuit

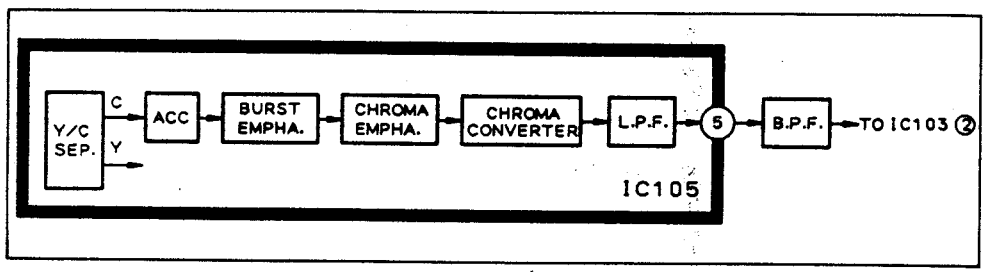


Fig. I-57

Chrominance signal, after Y/C separation in ICs 105 and 106, is regulated in its burst level to constant at ACC, and it undergoes burst and chrominance emphases.
Then 4.43 MHz chrominance signal is converted into a low frequency of 732 kHz and output from IC105 via LPF.
BPF extracts only 732 kHz ± 500 Hz component, which is fed to IC103 in which the component is mixed with other signals for recording.

(2) Playback

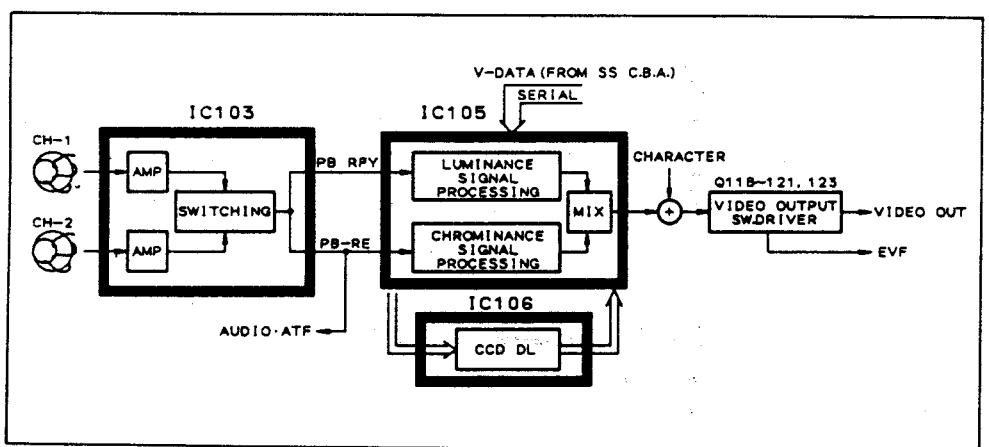


Fig. I-58

The signal sent from the video head is amplified in IC103 and becomes a continuous playback signal through switching. Then signal processing is conducted in each of ICs 105 and 106. After YC mixing, it is output from IC105. After mixed with the character signal for monitor TV display, it is output from the video output SW driver.

① Luminance signal circuit

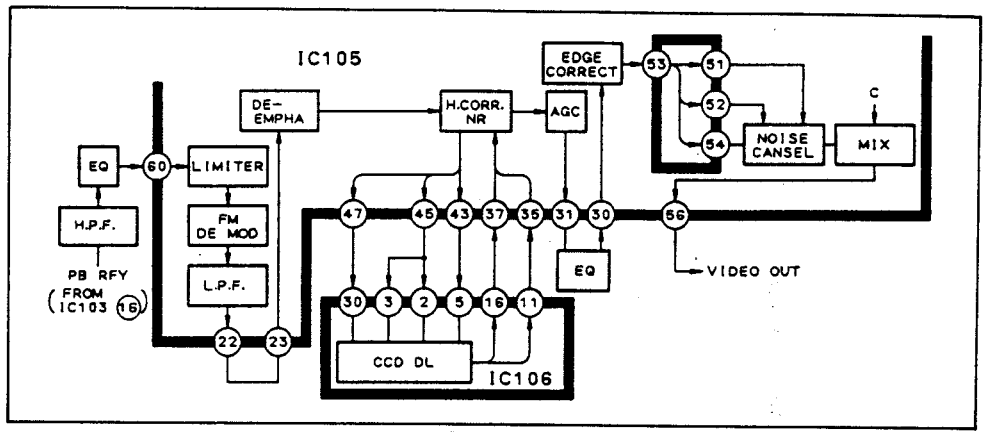


Fig. I-59

PB RFY signal is output from IC103. Only the Y (luminance) component is extracted by HPF and applied to IC105 after high frequency portion is emphasized in the equalizer circuit.
From the Y-RF signal applied to IC105, noise is cut by limiter. Its frequency is demodulated and then the frequency band is restricted through LPF followed by de-emphasis, thus restoring the original signal. The noise component is eliminated in the noise reduction circuit composed of ICs 105 and 106, and then it receives AGC.
The AGC-controlled signal is emphasized its intermediate and low frequency portions, and then subjected to a series of processings such as edge correction, noise cancellation and mixing with chrominance signal.

② Chrominance signal circuit

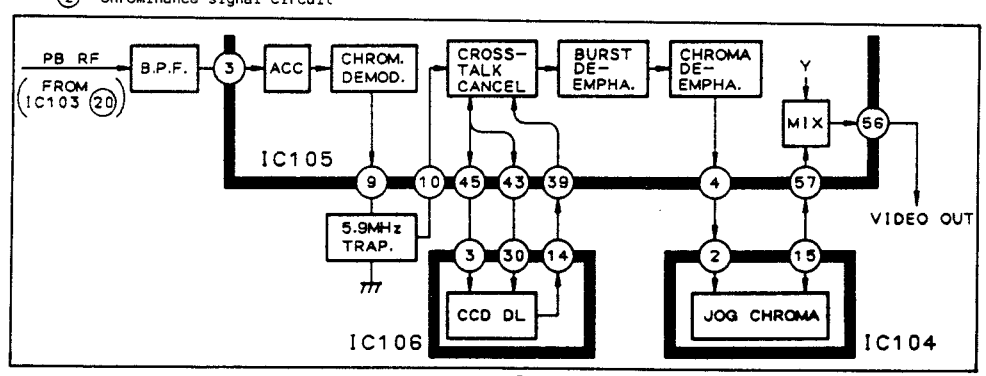


Fig. I-60

Only the chrominance signal component, which is low frequency-converted from PB RF, is extracted through BPF, and it is fed to IC105.
The C-RF signal fed to IC105 is eliminated its level change by ACC, and then demodulated into 4.43 MHz chrominance signal. By trap, 5.9 MHz component is removed and the crosstalk is canceled in the circuit consisting of ICs 105 and 106. Then the chrominance signal is mixed with luminance signal and outputted from pin 56. In SPECIAL PLAYBACK mode, IC104 corrects the color alignment. (The same IC in E70/708 is used.)

2-3-4 Audio Circuit

(1) Recording

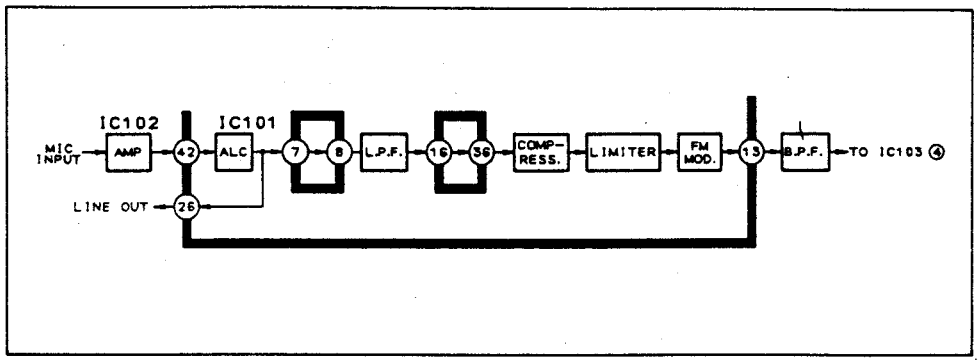


Fig. I-61

Input signal from the microphone is applied to IC101 via the amplifier.
The audio signal input to IC101 is regulated in its level to constant at ALC after passing through the selector switch and restricted in its band by LPF.
Next, a logarithmic compression is performed for noise reduction, and the level is restricted by the limiter. The signal is frequency-modulated by 1.5 MHz carrier wave and output from IC101. Then, it is input to IC103 after going through BPF to be mixed with other signals, and then recorded on the tape.

(2) Playback

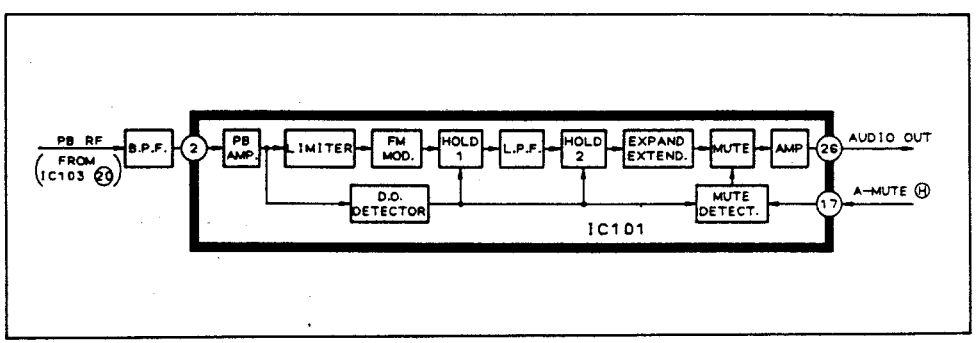


Fig. I-62

1.5 MHz AFM signal is taken out of PB RF signal through BPF, and is input to IC101.
Then the AFM signal is amplified by the PB amplifier and the variation of AM portion is removed by the limiter followed by frequency modulation. The other branched output signal from the PB amplifier is used for dropout correction.
The demodulated audio signal is fed to Hold-1 circuit to be reduced in its noise level at head switching and then applied to the dropout correction circuit which consists of LPF and Hold-2 circuit. When dropout occurs, it is compensated by Hold-2 circuit.
The output signal from Hold-2 is extended in the noise reduction circuit and becomes the original signal again and is output from IC101 via the mute switch.

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CHAPTER II. DISASSEMBLING/ADJUSTMENTS

1. Before Disassembling/Adjsutments

1-1 List of Maintenance Tools and Supplies

* Note: For recorder mechanical section, refer to the Service Manual for MC-4B issued separately. (DY8-3391-501 201)

Maintenance Tools

DESCRIPTION	TOOL NO.	REMARKS
Rec. Current Checker	DY9-1056-000	
Alignment Tape E (MONOSCO)	DY9-1062-000	
Alignment Tape G (V DO Adj)	DY9-1064-000	
Y/C Mix Amplifier	DY9-1079-000	
Extension Connector Kit for E80E, F	DY9-1087-500	New
Video Input Adaptor	DY9-1088-500	New
Color Bar Chart	DY9-2002-000	
Registration Chart	DY9-2004-000	
Logarithmic Gray Scale Chart	DY9-2005-000	
Adjuster (0.9 mm)	DY9-2020-000	
Adjuster (1.8 mm)	DY9-2041-000	New
Screwdriver (bit part only)	DY9-2030-000	
Yellow Filter	DY9-2022-000	
Color Chart Viewer (5600°K)	DY9-2039-000 115	
Hexagonal Key Wrench		Commercially available
Color Viewer Lamp (5600°K)	DY9-2040-000	New

Table II-1 (1)

Supplies

DESCRIPTION	TOOL NO.	REMARKS
Screw Lock 1401B	CY9-8012-000	
Grease GE-X8	CY9-8044-000	
Grease GE-C4	CY9-8045-000	
Alonalpha	CY9-8007-000	
Grease LT-SH	CY9-8033-000	

Table II-1 (2)

1-2 Preparation for Camera Section Adjustments

1-2-1 Setting

* Note: Prepare the Y/C Mix Amp. (DY9-1079-000) and the Extension Connector Kit for E80 E, F (DY9-1087-500).
As the power source, use the DC constant voltage supplier.

(1) Take out the Shield Case 2. (See 2-3 Camera Disassembling.)

(2) Connect the camera unit, the Y/C Mix Amp. and the extension connectors as illustrated below.

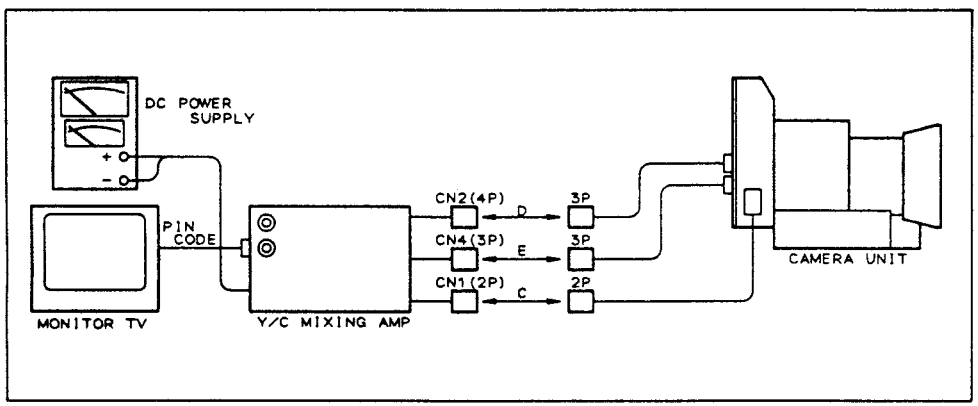


Fig. II-1

1-2-2 Basic Check

* Note: Picture quality deteriorates when the extension connectors are connected.
Never perform the adjustment at this state.

(1) Prepare the Extension Connectors Kit (DY9-1087-500) and connect them as illustrated below.

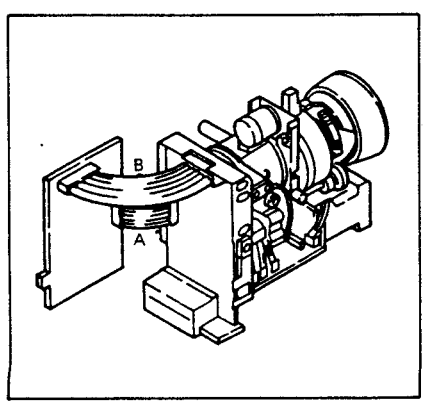


Fig. II-2

1-2-3 Other Preparation for Camera Adjustments

(1) Before adjustments, warm up the camcorder for more than 3 minutes.

(2) Use a light box of 5600°K temperature.

(3) Make a frame chart as illustrated in Fig. II-3.

(4) Set the standard angle of view for each chart as follows.

° Grayscale/Colorbar charts
Set the standard angle of view by using a full scan monitor or an oscilloscope.
To make a standard angle of view with a full scan monitor, shoot the chart full in the screen. (Fig. II-3)
To make a standard angle of view with an oscilloscope, set the range to 20 μs (video signal) as shown in Fig. II-3 and align the each center of chart and screen.

° Window chart and Frame chart
Take its image with center aligned at the same standard angle of view as for the grayscale chart.

° White chart (white paper)
Shoot at its center.

° Camera Electrical Adjustments
Except for blooming adjustment, set an object distance at 1.4 m approx..

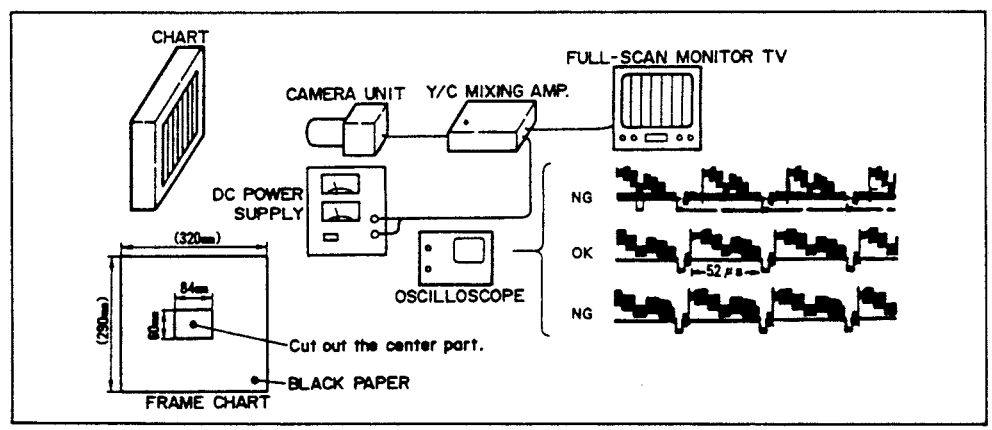


Fig. II-3

1-3 Preparation for Recorder Section Adjustment

1-3-1 Setting (Overview)

* Notes: 1. When setting, be careful not to break the claw at left cover.
2. To facilitate the tape travel adjustment, etc., the recorder section can be operated independently with an extension connector F. (At this state, characters are not displayed on monitor TV.)

(1) Prepare the following connector of Extension Connector Kit for E80 (DY9-1087-500).
F: Power supply connector for recorder section

(2) Prepare the Video Input Adaptor (DY9-1088-500)

(3) Plug each connectors as follows. (Fig. II-4)

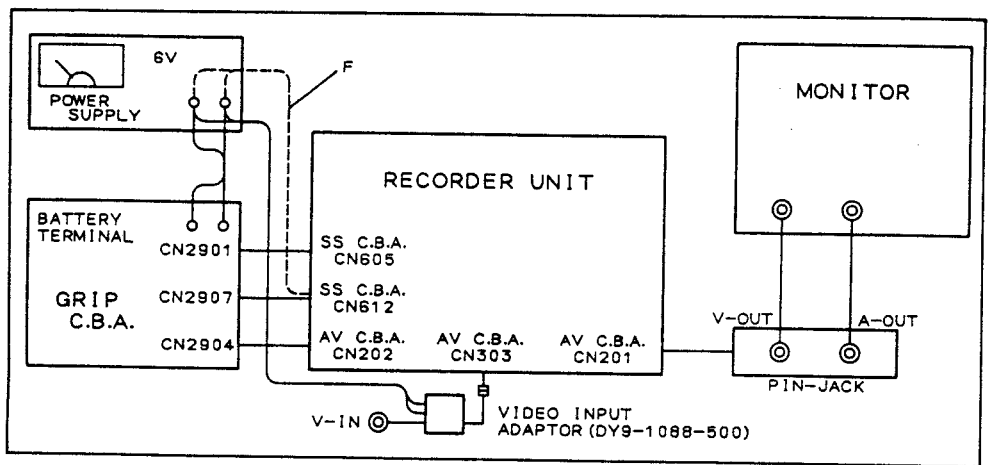


Fig. II-4

1-3-2 How to Check C.B.A.s

(1) Remove two setscrews securing the AV C.B.A. and the recorder holder.

* Remarks: At this state, almost of all electrical checks (recorder section) can be performed.

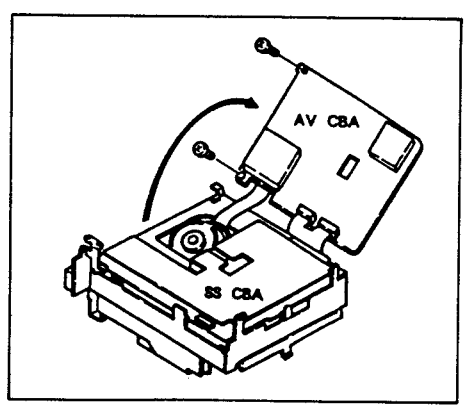


Fig. II-5

(2) Remove two setscrews securing the SS C.B.A..

(3) To open the C.B.A., use the following connectors of Extension Connector Kit for E80.

* Remarks: At this state, the checking of rear side of mechanism can be performed.

I: Extension connector for drum motor (1 pc.)
J: Extension connector for T reel (1 pc.)
K: Extension connector for S reel (1 pc.)
L: Connector for I & K (2 pcs.)
M: Connector for J (1 pc.)

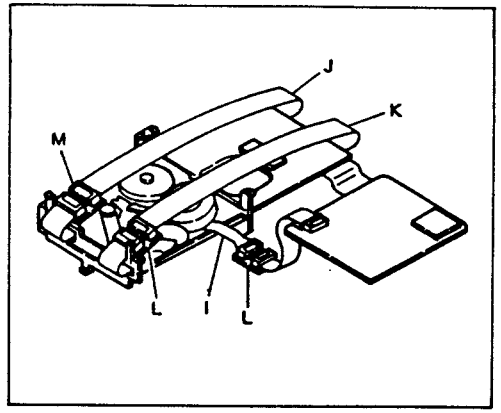


Fig. II-6

1-3-3 Setting (Actual view)

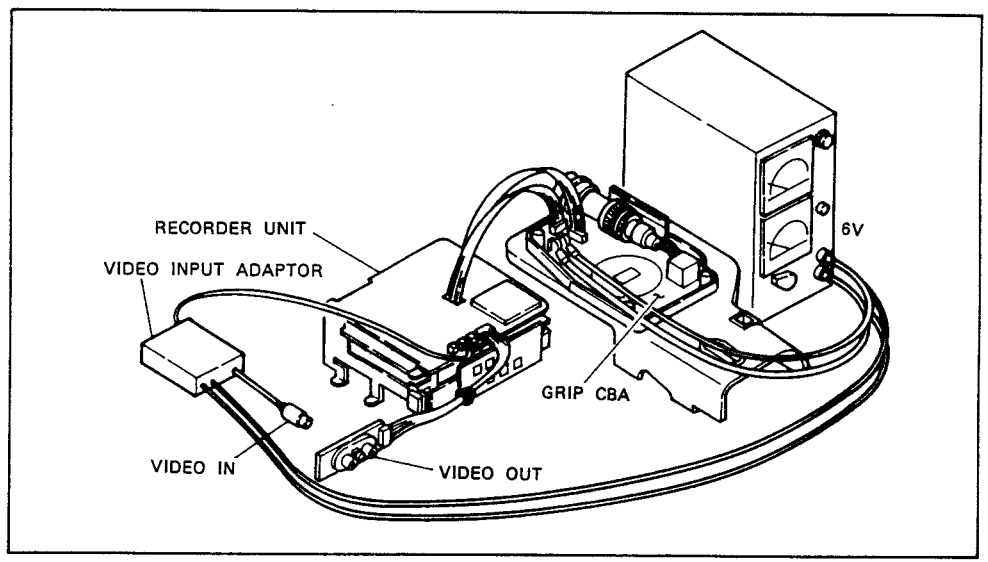
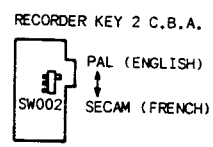


Fig. II-7

1-3-4 Chracter Indication

The character can be displayed either in English or French with a SW002 of Recorder Key 2 C.B.A..
When the Recorder Key 2 C.B.A. is replaced, swtich SW002 over to the language according to your necessity.



1-3-5 Service Modes

Service modes are provided for the adjustment and operational checks as follows.

(1) * Service Mode 1

With these modes, the adjustments/checks at tape pass section can be performed. (The duty ratio of switching pulse is changed.)

1) SERVICE 1-01
Track shifting mode for tape travel checks. (70% on-track)

2) SERVICE 1-02
On-track (100%) mode for RF envelope check.

* Service Mode 2

With these modes, the adjustments/checks at system control servo section, each motors and the sensors can be performed as follows.

1) SERVICE 2-01 : Undercut adjustment/ATF bias adjustment can be performed.
2) SERVICE 2-02 : State at each sensor, motor and mechanisms can be checked.
3) SERVICE 2-03 : Each key input and state at remote control system can be checked.
4) SERVICE 2-04 : Error/abnormal check functions can be cancelled. (i.e. drum/capstan motors, reels.)

(2) Setting

Push the SERVICE 1 and 2 switches on R-KEY 2 C.B.A. to set the above service moeds.
According to the time pushed, the each mode changes as follows.

By shorting the pattern of remote control, the service modes, can be set, too.
At this state, each operational checks can be performed without disassembling the unit.

Note: When a remote control system is used, SERVICE 2 only can be set. For details, refer to " 6 Service Mode" in page I-42.

Times to be pushed	1-time push	2-time push	3-time push	4-time push	5-time push
SERVICE 1	1-01	1-02	Normal	1-01	1-02
SERVICE 2	2-01	2-02	2-03	2-04	Normal

Table II-2

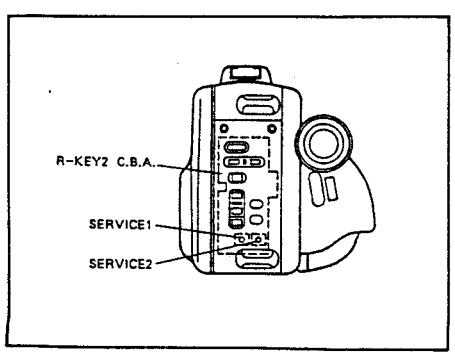


Fig. II-8

2. Disassembling/Reassembling

2-1 Remvoal/Reassembling of Covers

2-1-1 Removal of Eyepiece, Microphone and Lithium Battery Cover

(1) Take off the eyepiece and the microphone.
(2) Take off the lithium battery cover.

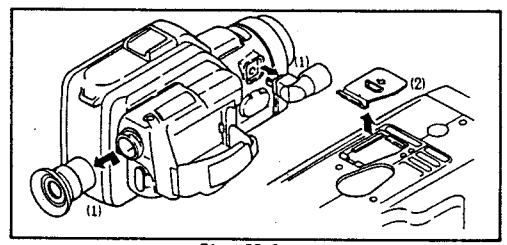


Fig. II-9

2-1-2 Removal of Cassette Cover

(1) Peel off two cassette cover seals.
(2) Remove two setscrews (a).
(3) Take off the cassette cover while sliding it toward the direction indicated by the arrow mark.

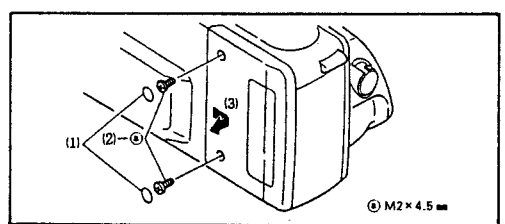


Fig. II-10

2-1-3 Removal of Left Grip Cover

(1) Turn the grip downward by 90°. Then remove two setscrews (c) on the rear side.
(2) Remove two setscrews (c) on the front.
(3) Take off the left grip cover.

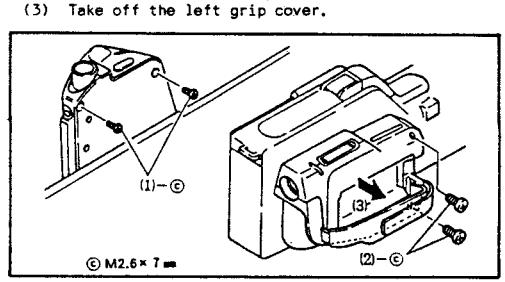


Fig. II-11

2-1-4 Removal of Left Cover

(1) Unplug the three connectors between the unit and grip.
(2) Remove seven setscrews (a) and three setscrews (b).
(3) Set the zoom lever to wide angle position.
(4) Remove the left cover from the rear side ((1)). Then, while pulling the visible light cutoff filter slightly toward front ((2)), take off the left cover ((3)). At this time, be careful not to damage the rubber ring.
(5) Unplug three connectors from the left cover.

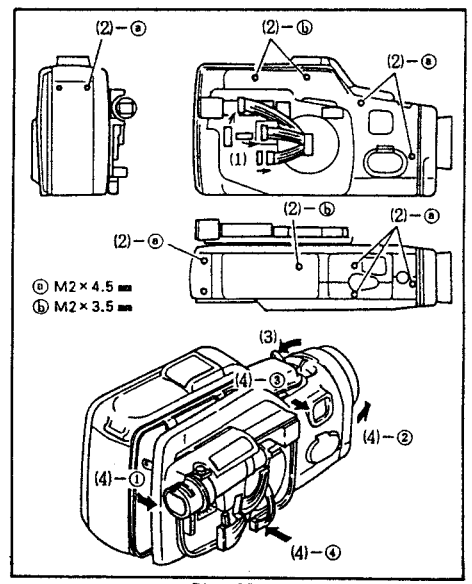


Fig. II-12

2-1-5 Removal of Visible Light Cutoff Fitler

(1) While pressing the index line part ((1)), remove the visible light cutoff filter ((2)).
(2) Remove the rubber ring.

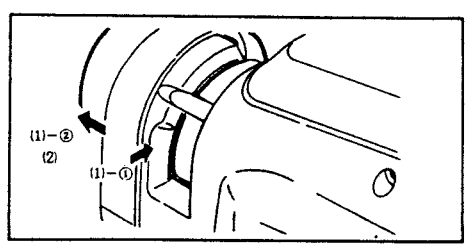


Fig. II-13

2-1-6 Removal of Top Cover

(1) Remove three setscrews (a).
(2) Take off the top cover.

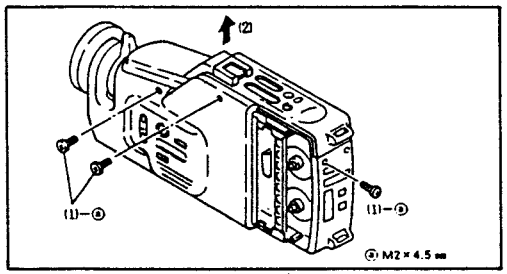


Fig. II-14

2-1-7 Removal of Camera and Recorder Units

(1) Remove a screw (d).
(2) Unplug eight connectors between the camera and the recorder units.
(3) Take out the camera and the recorder units.
(4) Separate the camera and the recorder units.

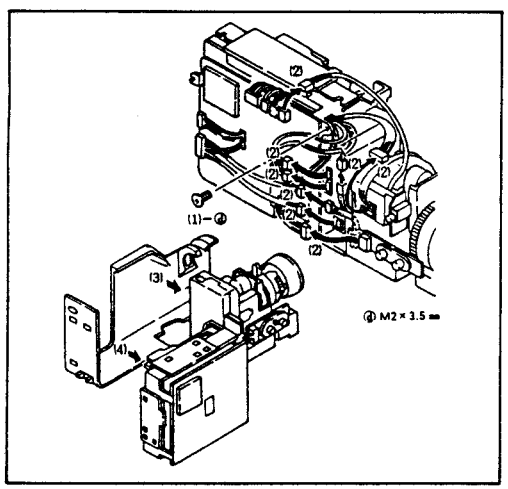


Fig. II-15

2-1-8 Removal of Grip C.B.A.

(1) To unplug the connector between T/W Power Switch and EVF, shift the CRT. Then, unplug the connector.
(2) Remove three setscrews (e).
(3) Take out the Grip C.B.A.

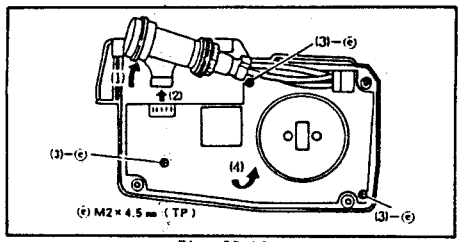


Fig. II-16

2-1-9 Removal of Grip Right Cover

(1) Remove two setscrews (f).
(2) Take off the grip right cover.

* Note: * When replacing a steel ball/plate, apply Grease (LT-SH CY9-8033-000).
* When replacing a screw (f) apply Screw Lock 1401B (CY9-8012-000).

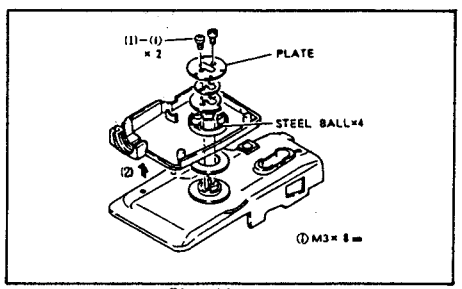


Fig. II-17

2-1-10 Removal of Rear Cover

(1) Remove a screw (a).
(2) Take off the rear cover.

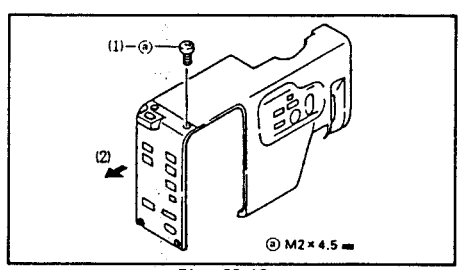


Fig. II-18

2-1-11 Reassembling of Covers

When reassembling, perform the reverse procedures of disassembling.
For a visible light cut-off filter and a rubber ring, install them after reassembling the left cover.

2-2 Disassembling of Lens Section

2-2-1 Removal of AF C.B.A.

(1) Unplug the four connectors listed below.
AF C.B.A. ↔ PZ motor
AF C.B.A. ↔ AF MOTOR
AF C.B.A. ↔ SPC C.B.A.
AF C.B.A. ↔ IRED C.B.A.
(2) Remove a screw.
(3) Take out the AF C.B.A..

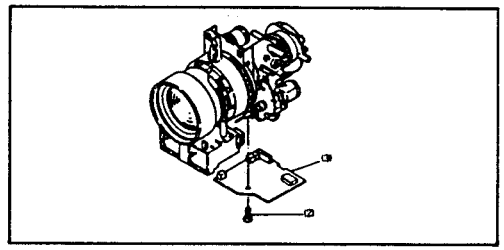


Fig. II-19

2-2-2 Removal of AF and PZ Motors

(1) Remove two setscrews.
(2) Demount the AF and the PZ motors.

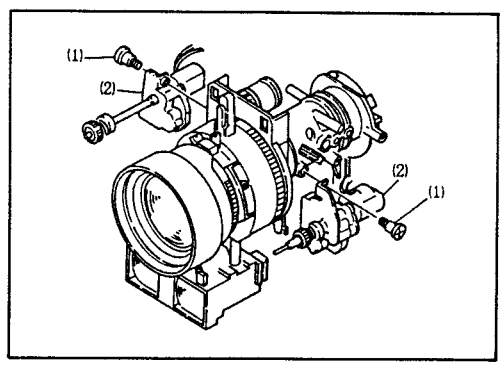


Fig. II-20

2-2-3 Removal of AF Block

(1) Remove two setscrews.
* Note: The setscrew hole on IRED mount side is covered with a tape. When reassembling, be sure to reattach the tape.
(2) Detach the AF block.
* Notes: 1. If the prism is turned excessively, or undue pressure is exerted on it, the shaft holding springs (two thin wire springs) may come off.
2. When reattaching the AF block, make sure that the focusing ring cam surface (A) is interlocked with the prism arm (B) properly.
3. After remounting the AF block, be sure to adjust the AF distance measuring function.

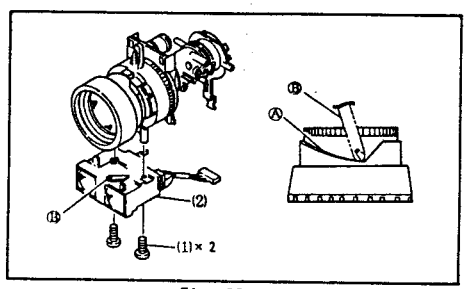


Fig. II-21

2-2-4 Removal of Relay lens

(1) Remove a screw.
(2) Take out the relay lens a'ssy..

* Note: After remounting the relay lens a'ssy., be sure to perform back-focus adjustment.

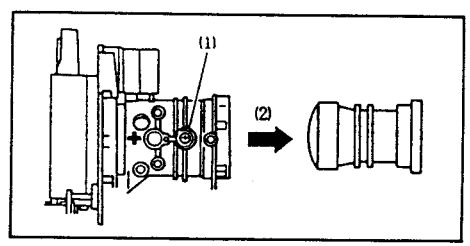


Fig. II-22

2-2-5 Removal of IG Meter

(1) Remove the IG cover.
(2) Remove a screw.
(3) Demount the IG meter.

* Note: When detaching/attaching, be careful not to deform the diaphragm blades. Remember that the diaphragm blades are likely to come off its dowels. To avoid it, check that the diaphragm blades are secured correctly.

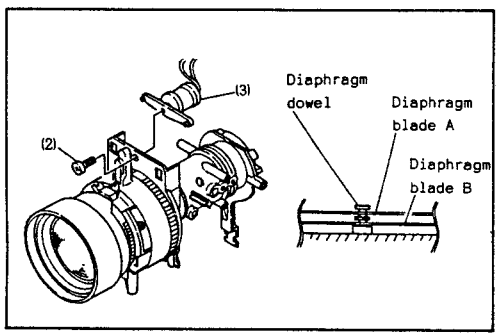


Fig. II-23

2-2-6 Removal of Diaphragm Blades A and B

* Note: Be extremely careful not to bend or contaminate the diaphragm blades. Never touch the diaphragm blades with bare hand or fingers.

(1) Remove the IG meter.
(2) Align the part (a) of diaphragm blade A with its dowel position, then detach the diaphragm blade A.
(3) Detach the diaphragm B in the same manner.

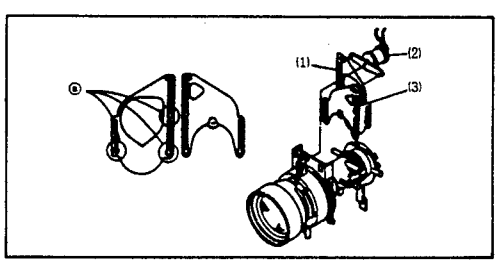


Fig. II-24

2-2-7 Removal of Zoom Sheet

(1) Peel off the zoom sheet using tweezers or equivalent.

* Note: When reattaching the zoom sheet, take care not to make it creased or kinked.

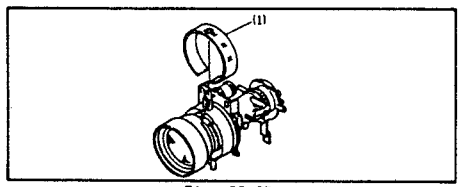


Fig. II-25

2-2-8 Removal of Zoom Ring

(1) Take out the AF black, AF C.B.A. and the PZ motors.
(2) Remove the N stopper.
Demount the focus lens a'ssy..
(3) With the focus side facing down, remove the setscrews securing the relay holder and the fixed lens barrel.
(4) With the fixed lens barrel mounted, turn the focus side up.
(5) Set the zoom rings to the telephoto-end position. Then, remove the variator retaining plate spring and setscrew.
(6) While pulling up the fixed lens barrel (A) straight gradually, take out it together with the cam ring (b) and the zoom ring (c).
(7) Remove the zoom ring and the cam ring from the fixed lens barrel.

* Note: Take care not to let the compensating spring (D) pop astray.

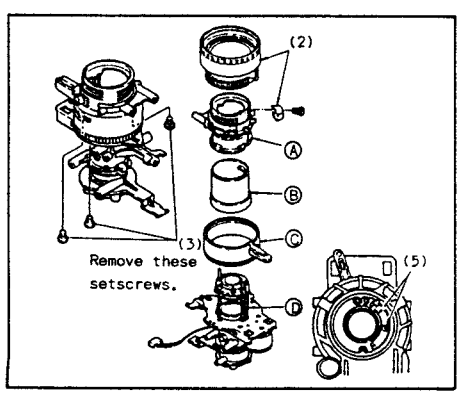


Fig. II-26

2-2-9 Replacement of Zoom Ring (Refer to Fig. II-26)

(1) Attach the cam ring and the zoom ring to the fixed lens barrel.
* Note: Engage the cam ring with the part (E) of the zoom ring.
(2) Set the zoom lever to position (H).
Mount the fixed lens barrel straight gradually.
* Note: Align the zoom shafts (F) x 3 with the positioning holes (G) on the fixed lens barrel.
(3) Set the zoom ring to the telephoto end position.
Attach the variator retaining plate spring. (See Fig. II-26 (5))
* Note: To make sure that the zoom ring can be turned smoothly, move the zoom ring between telephoto end and wide-angle end repeatedly.
(4) While taking care not to allow the fixed lens barrel to come off, turn the focus side down.
(5) Secure the fixed lens barrel to the relay holder with three setscrews.
(6) Mount the focus lens a'ssy. on the fixed lens barrel.
(7) Attach the N stopper to the fixed lens barrel.
(8) Install the AF block, AF C.B.A., AF motor and PZ motor.
(9) Check each section if operates properly.
(10) Perform AF distance measuring adjustment.
If deviated, adjust it.

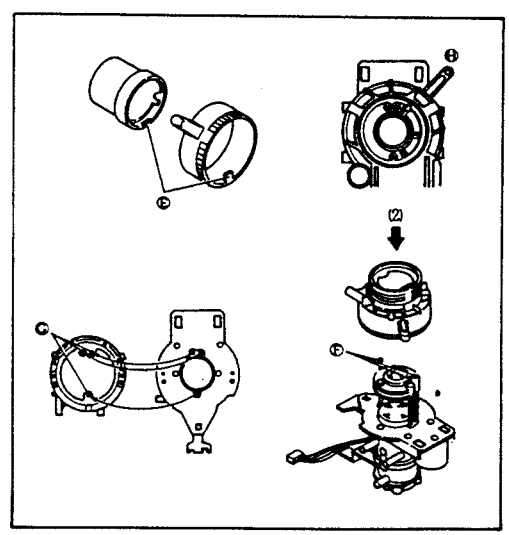


Fig. II-27

2-3 Disassembling of Camera Section

2-3-1 Removal of Shield Case 2

(1) With the connectors plugged, detach the Camera Key C.B.A..
(2) Remove a screw (a). Then, detach the CCD radiation plate.
(3) Detach the DC/DC converter.
(4) Unsolder five soldering points of shield case.
(5) Take off the Shield Case 2.

* The camera electrical adjustments can be performed, if DC/DC converter is attached at this state.

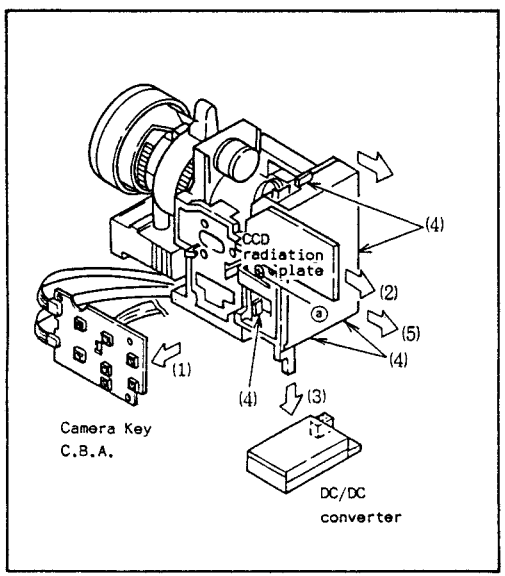


Fig. II-28

2-3-2 Removal of Camera Holder 1 and Process C.B.A.

(1) Unplug three connectors of Camera Key C.B.A..
(2) Unplug the connector of Process C.B.A.. Then, take off the Process C.B.A..
(3) Remove a screw (a). Then take off the Camera Holder 2.
(4) Remove three setscrews (b). Then take off the Camera Holder 1.

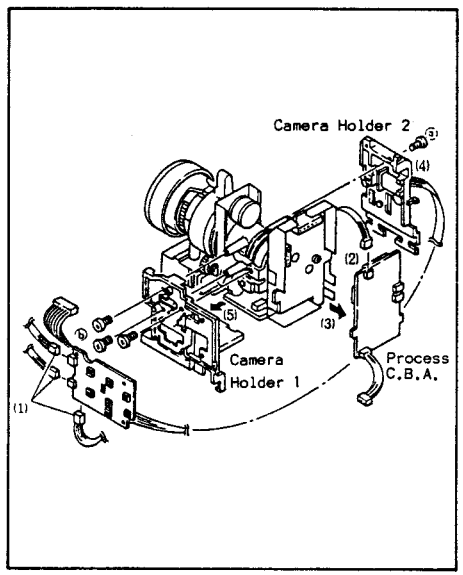


Fig. II-29

2-3-3 Separation of Lens and Sensor C.B.A.

(1) Remove two setscrews (a). Then, separate the lens section and the Sensor C.B.A..
(2) Unsolder three points which fix the Sensor C.B.A. and the Shield Case 1.
(3) Unsolder the solderings at pins of CCD.
(4) Remove two setscrews (b). Then, separate the CCD holder and the Sensor C.B.A..

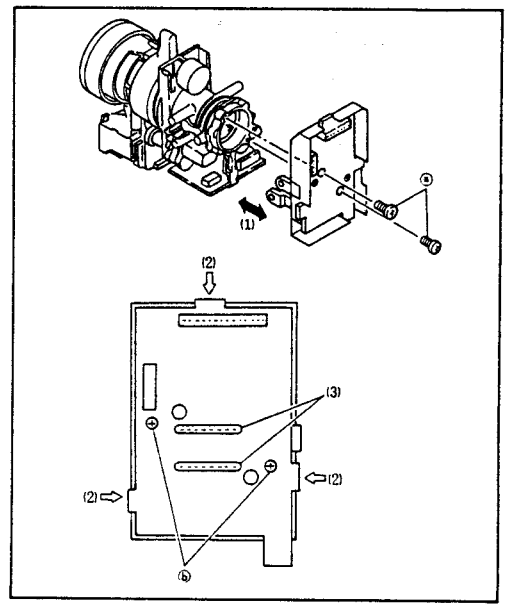


Fig. II-30

2-3-4 Removal of CCD Holder

(1) Peel off the insulation sheet.
(2) Remove two setscrews (a).
(3) Disassemble the CCD holder section.

* Note: When reassembling, pay utmost attention to the direction of CCD and the crystal filter.
When reassembling CCD, push the CCD a little in the direction of (A) in the figure. Then, fix it with a CCD Support Plate.

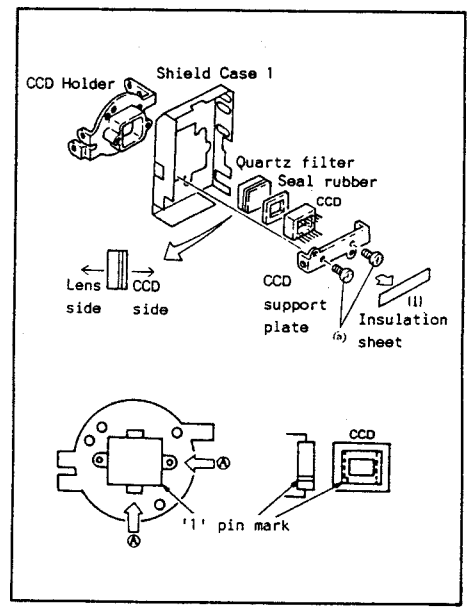


Fig. II-31

2-4 Disassembling of Recorder Section

2-4-1 Removal of R-KEY 1 and 2 C.B.A.s

(1) Remove two setscrews (a).
(2) Take off R-KEY 1 and 2 C.B.A.s.

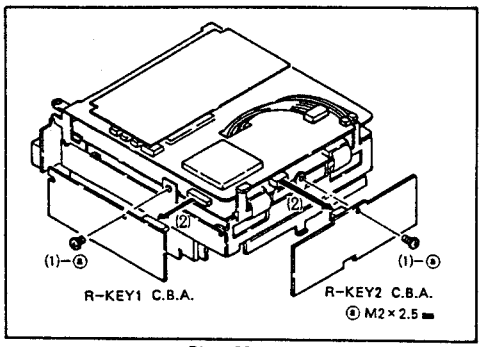


Fig. II-32

2-4-2 Removal of Audio and Video C.B.A.

(1) Remove two setscrews (b).
(2) Remove the shield case and plate.
Then, unplug CN301.
(3) While opening the Audio and Video C.B.A., unplug CN605 and 612.
(4) Unplug CN302 and 303.
Then, take off the Audio and Video C.B.A..

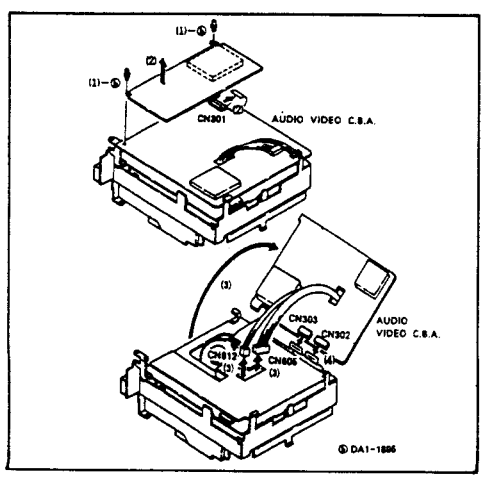


Fig. II-33

2-4-3 Removal of Syscon Servo C.B.A.

(1) Remove two setscrews (a).
(2) Unplug CN401, 411, 431, 601, 604, 608 and 609.
(3) Take off the Syscon Servo C.B.A..

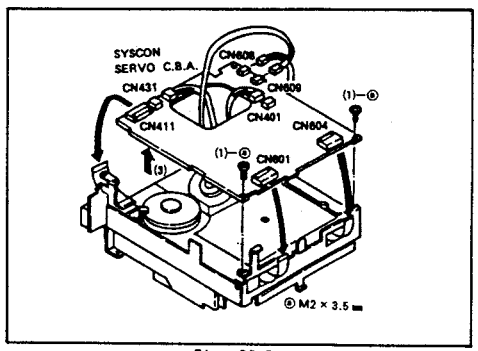


Fig. II-34

2-4-4 Removal of Recorder Holder

(1) Remove two setscrews (a). Then, take off the recorder holder 3.
(2) Remove a screw (c). Then, take off the recorder holder 2.
(3) Remove a screw (a). Then, take off the recorder holder 4.
(4) Unplug the connector which is connected to the capstan motor.
(5) Remove two setscrews (d). Then, take off the recorder holder 1.

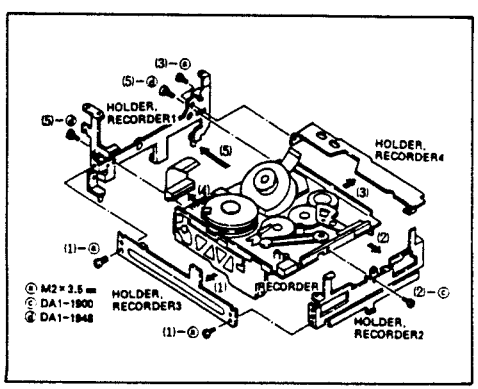


Fig. II-35

3. Adjustments (Lens Section)

3-1 Back Focus Adjustment (T/W Zoom Correction)

CHART	Siemens chart located 3 meters away
M. EQ.	Monitor TV
TOOL	Phillips screwdriver
ADJ.	Focusing ring relay lens

* Note: Open the aperture fully as possible.

(1) Loosen the screw (a).
(2) With telephoto-end zoom setting, bring the pattern image into focus by turning the focusing ring.
(3) With wide angle end zoom setting, put the pattern image into focus by moving the relay lens back and forth.
(4) Repeat the above steps (2) and (3) to remove defocusing at telephoto and wide angle ends.
(5) Tighten the screw (a).
* Note: When tightening, be careful not to shift the relay lens from the correct position.
(6) Check the AF distance measurement function.

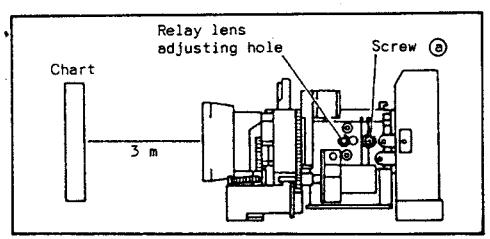


Fig. II-36

3-2 SPC Parallax Adjustment

CHART	SPC Parallax adjustment chart (equivalent to that used for VM-E2)
M. EQ.	Monitor TV, Light box
TOOL	Phillips screw driver (DY9-2030-000)
ADJ.	SPC C.B.A.
SPEC.	Align SPC position with beam from light box

* Note: Prepare the chart shown in Fig. II-37.

(1) Place the adjustment chart on the light box and shoot it three meters away from the front lens.
(2) Align the center of chart image with that of monitor TV, then bring the chart image into focus.
(3) Loosen two setscrews (a).
* Note: Before tightening setscrews (a), clean Screw Lock to prevent wrong positioning of SPC C.B.A..
(4) Moves SPC C.B.A. to align with the beam from the light box. At this step, adjust the vertical position mainly.
Then, tighten two setscrews (a).
(5) Apply Screw Lock to two setscrews.

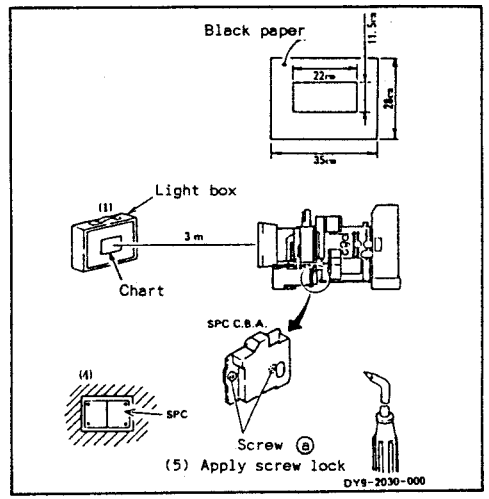


Fig. II-37

3-3 AF Distance Measurement Adjustment

CHART	Siemens chart, 60% or higher reflectance chart
M. EQ.	Monitor TV
TOOL	Screwdriver, section paper, index strip
ADJ.	AF distance adjusting screw (a).
SPEC.	+0.75 mm -1.0 mm

* Note: Open the aperture fully as possible.

(1) Attach the section paper and the index strip as shown in Fig. II-38.
(2) Shoot the siemens chart from three meters away.
(3) With telephoto-end setting, bring the chart image into best focus. Then, mark the relevant index position on the section paper.
(4) Replace the siemens chart with the 60% or higher reflectance chart.
(5) Mark the center AF stop position between the infinity and nearest ends on the section paper.
(6) Check a difference between the positions marked at steps (3) and (5) is within the specified range .
(7) If not, carry out adjustment by turning screw (a).

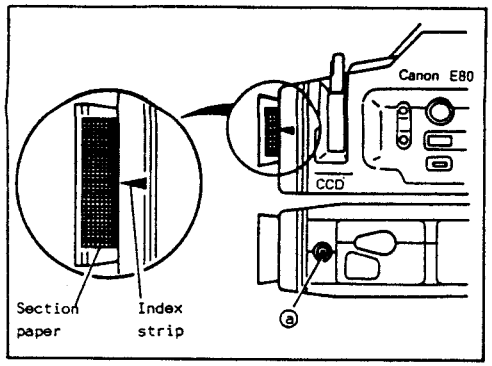


Fig. II-38

3-4 Preparation for Lens Focus Adjustment

* Note: For this adjustment, pick up an actual scene at infinity (65 meters or more away), or use a collimator. (Near subject cannot be used for this adjustment)

Described below is the preparator procedures for using the single-lens reflex camera and lens (focal length: 300 mm or more recommended) instead of a collimator.

CHART	Ground glass (30 mm x 40 mm, approx.)
TOOL	Single-lens reflex camera, lens (focal length: 200 mm or more, magnifier

(1) Open the aperture of single-reflex camera fully. Then, open the rear lid.

* Note: If the shutter equips the valve mechanism, lock it for opening the aperture. If not (e.g. Canon T series etc.), open the aperture by using the slow shutter and take out the internal battery immediately while the shutter is opened.

(2) Secure the ground glass to the inside rail face by pressing it. At this step, the ground surface should face the lens side.

(3) Shoot a scene at infinity. To check if it is in best focus, enlarge the image on the ground glass through the magnifier.

* Note: Distance for infinity: See Fig. II-39.

(4) After the above checking, remove the ground glass once and mark cross hairlines on it. Then, attach it to the camera again.

*Note: Using this substitute for collimator, the back focus adjustment (T/W zoom correction), 3-1 can be performed with high accuracy within a short time.

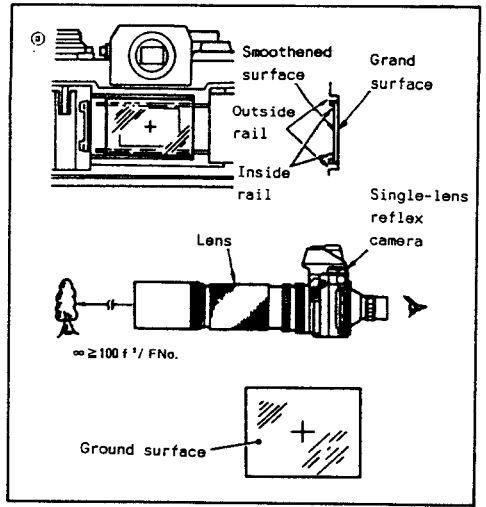


Fig. II-39

3-5 Lens Focus Adjustment

* Note: Perform this adjustment only when the focus lens a'ssy. is replaced.

Described below is the adjustment procedure for using the single-lens reflex camera instead of a collimator.

CHART	Ground glass (30 mm x 40 mm, approx.)
M. EQ.	Monitor TV
TOOL	Single-lens reflex camera, lens (focal length: 200 mm or more), Phillips screwdriver
ADJ.	Focusing lens, relay lens
SPEC.	Within 1/3 of infinity (∞) (+0.5 mm)

(1) Engage the concave helicoid with the focusing ring.

(2) Remove the N Stopper, and take out the focus lens a'ssy..

* Notes: 1. When reassembling, do not exert undue force at screwing-in, or the thread may be damaged.
2. When reassembling, apply grease specified.

(3) Align the optical axis of VM-E80 lens with that of single-lens reflex camera as accurately as possible. (Visual alignment)

(4) With telephoto-end zoom setting, adjust focus using the front lens. At this time, hold the focusing ring to the infinity (∞) stop position, and turn the concave helicoid until the best focus is obtained.

(5) Loosen the screw ⓐ.

(6) Move the relay lens back and forth with wide angle end to bring the object into best focus.

(7) Repeat steps (4) and (6) until the object is into best focus both in wide and telephoto ends.

(8) Lock the relay lens and confirm that the object is into best focus.

(9) Confirm that the focusing ring is butted onto the stopper at infinity side. Then, fix the focusing ring and the concave helicoid with an instantaneous adhesives specified. (Aronalpha)

* Notes: 1. Do not apply adhesive excessively and also be careful not to drop it onto the other positions except indicated. (esp. AF cam part Ⓓ)
2. Do not touch forcibly for five minutes after application.

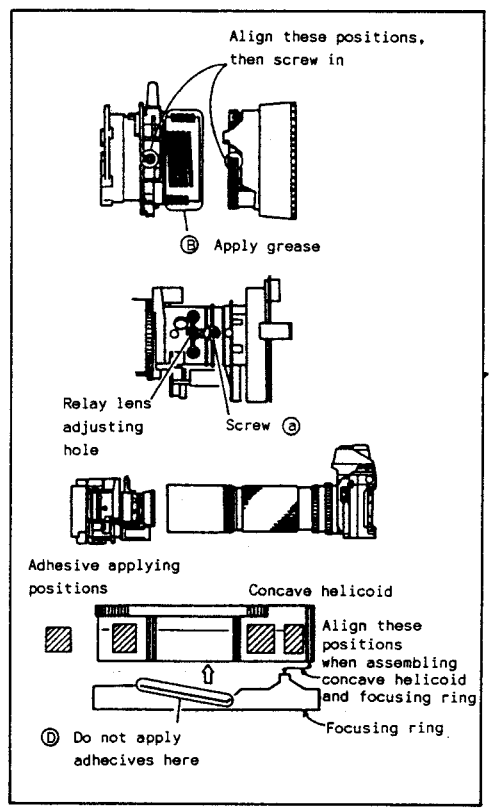


Fig. II-40

3-6 Oil/Grease/Bond Application Positions

* Note: After cleaning, replacing, etc., apply the followings to the indicated positions in the figure.

1. Grease GE-X8
2. Grease GE-C4
3. Instantaneous adhesive Aronalpha
4. Screw Lock

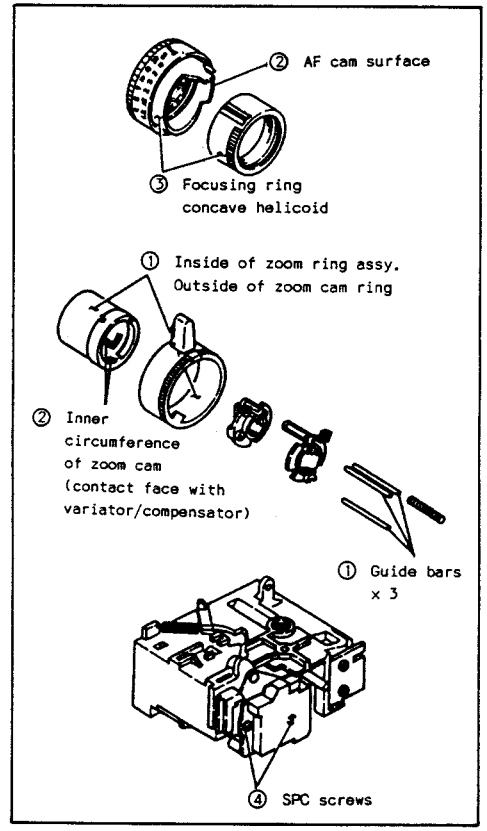


Fig. II-41

4. Adjustments (Camera Section)

Note: For the following adjustments from 4-3 to 4-12, set the PRESET mode.
To set it, connect TP2220 (W.B. PRESET) and TP2216 (+5V).

4-1 Clock Frequency Adjustment

M. EQ.	Frequency counter *Connect via oscilloscope
TP/TRIG.	PRO C.B.A. TP2207(SP2)P TP2202(GND)V
ADJ.	SNES C.B.A. VC2001(CLOCK)
SPEC.	4.828125MHz ± 0.000015MHz

4-2 PLL Adjustment

M. EQ.	Digital voltmeter
TP/TRIG.	TP2209(PLL)T TP2202(GND)V
ADJ.	SENS C.B.A. VC2202(PLL)
SPEC.	2.5V ± 0.1V

4-3 Auto Iris Adjustment

* Note: After adjustment, move iris from lens-closed to opened to confirm the specification obtained.

CHRT	Grayscale
MODE	AWB PRESET
M. EQ.	Oscilloscope
TP/TRIG.	TP2203(Y IRIS)Q/TP2208(FH/2)S
ADJ.	PRO C.B.A. VR2201(IRIS)
SPEC.	250 ± 10mV

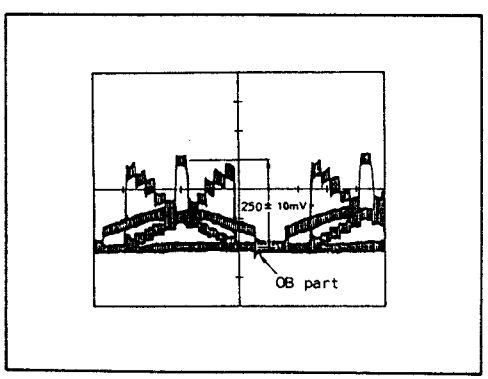


Fig. II-42 10 µs/10 mV

4-4 OB Set Adjustment

CHART	lens closed
MODE	AWB PRESET
M. EQ.	Oscilloscope
TP/TRIG.	TP2204(Y AGC)R/TP2208(FH/2)S
ADJ.	PRO C.B.A. VR2202(OB SET)
SPEC.	Levels of waveform and blanking centers to be the same.

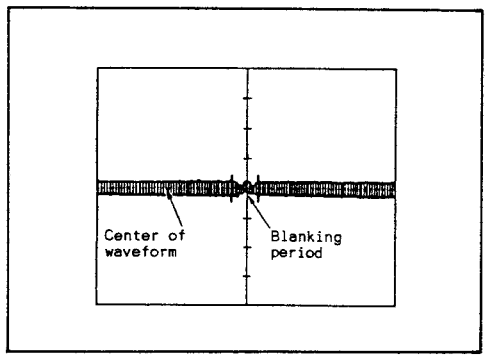


Fig. II-43 10 µs/10 mV

4-5 V Aperture Adjustment

CHART	Grayscale
MODE	AWB PRESET
M. EQ.	Oscilloscope
TP/TRIG.	TP2212(V.APA)J/TP2208(FH/2)S
ADJ.	VR2204(V.APA)
SPEC.	Minimize signal component

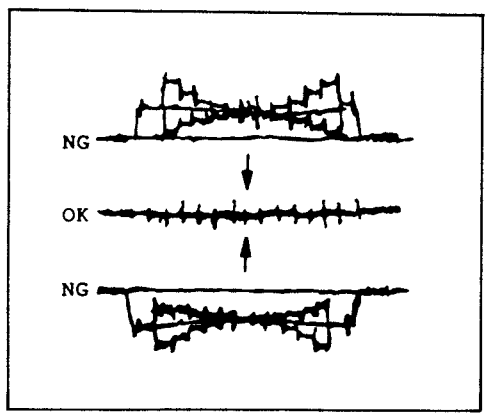


Fig. II-44 10 µs/10 mV

4-6 Y Level Adjustment

* Note: Before adjustment, release the white clip.
Use the waveform having higher center peak.

CHART	Grayscale
MODE	AWB PRESET
M. EQ.	Oscilloscope
TP/TRIG.	TP2213(Y OUT)I/TP2208(FH/2)S
ADJ.	VR2203(Y LEVEL)
SPEC.	1220 ± 20mV

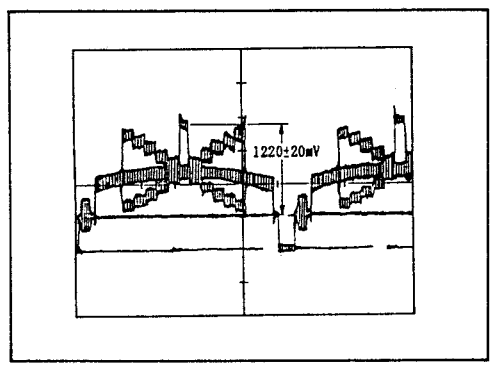


Fig. II-45 10 µs/50 mV

4-7 White Clip Adjustment

CHART	Window chart
MODE	AWB PRESET
M. EQ.	Oscilloscope
TP/TRIG.	TP2213(Y.OUT)/TP2208(FH/2)
ADJ.	VR2303(W.CLIP)
SPEC.	1400 + 20mV

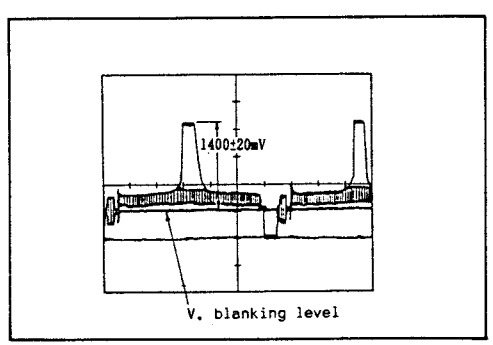


Fig. II-46 10 µs/50 mV

4-8 Color Difference Gain Adjustment

CHART	Color bar
MODE	AWB PRESET
M. EQ.	Vectorscope
ADJ.	VR2207(C1H LEVEL)
SPEC.	Each dots to be together

* Note: If the above specification not obtained, the followings can be tolerated.
Burst level = dG 15%

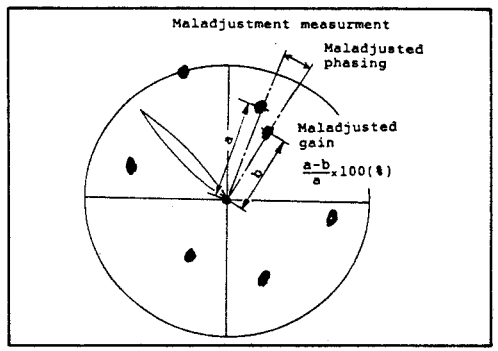


Fig. II-47

4-9 Carrier Balance Adjustment

CHART	Grayscale
MODE	AWB PRESET
M. EQ.	Vectorscope
ADJ.	VR2301(B-Y C.B.) VR2304(R-Y C.B.)
SPEC.	Bright dots to be centered

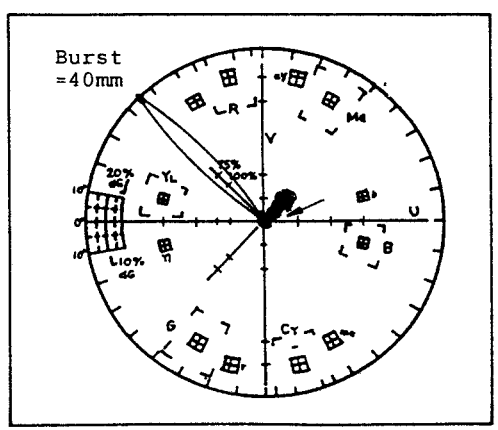


Fig. II-48

4-10 Modulation Axis Adjustment

CHART	Colorbar
MODE	AWB PRESET
M. EQ.	Vectorscope
ADJ.	VC2301(SC90) VR2306(BURST PHASE)
SPEC.	Make each bright dots into one as possible.

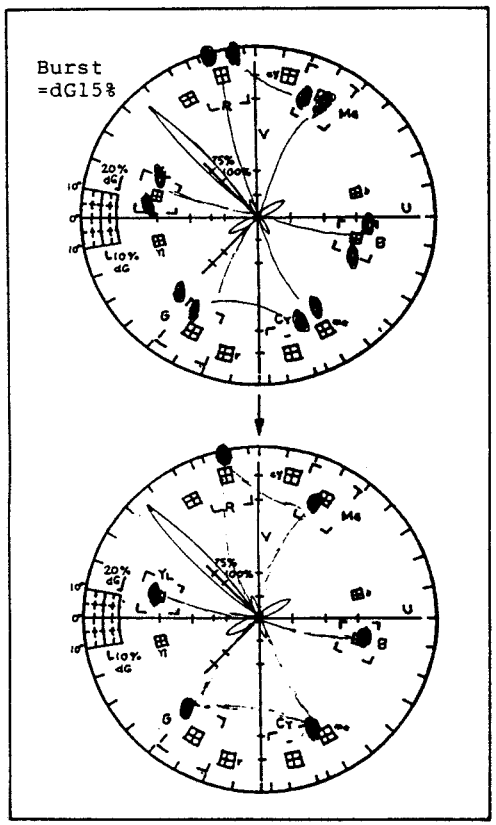


Fig. II-49

4-11 White Balance Adjustment

CHART	Grayscale
MODE	AWB PRESET
M. EQ.	Vectroscope
ADJ.	VR2205(R WB) VR2206(B WB)
SPEC.	Minimize bright dot as possilbe

4-12 Color Balance Adjustment

* Note: Adjust R's phase and gain mainly.

CHART	Colorbar	
MODE	AWB PRESET	
M. EQ.	Vectorscope	
ADJ.	VR2302(B-Y LEVEL) VR2305(R-Y LEVEL)	
SPEC.	Color Phase	Gain (burst ratio)
	R 106 ± 2°	1.5 ± 0.1 times
	Ye 166 ± 4°	1.0 ± 0.2 times
	G 240 ± 8°	

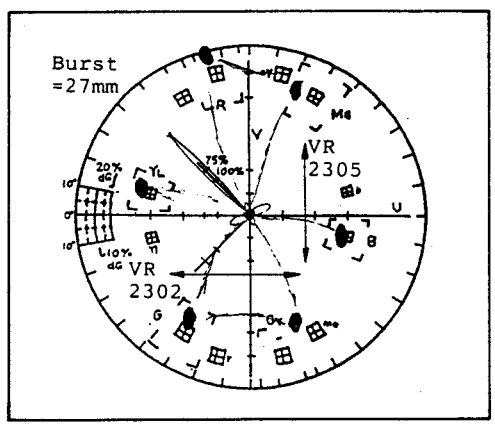


Fig. II-50

4-13 Full Auto White Balance Adjustments 1 and 2

CHART	White chart
M. EQ.	Vectorscope
TOOL	Halogen lamp

* Full Auto White Balance Adjustment 1

MODE	FAWB R-Y CH PRO. C.B.A. TP2217(CH SEL)G ↔ TP2215(GND)E TP2219(FL TEST)F ↔ TP2215(GND)E TP2220(WB PRESET)B ↔ TP2215(GND)E
ADJ.	VR2601(AWB R-Y) VR2604(AWB B-B)
SPEC.	Set bright dot to position in Fig. II-51 ⓐ.

* Full Auto White Balance Adjustment 2

MODE	FAWB B-Y CH PRO. C.B.A. TP2217(CH SEL)G ↔ TP2216(+5V) TP2219(FL TEST)F ↔ TP2215(GND) TP2220(WB PRESET)B ↔ TP2215(GND)
SPEC.	Set bright dot to position in Fig. II-51 ⓑ.

Procedures:

* Note: Turn VR gradually.

1) Shoot white chart with halogen lamp lighted.
2) Set each bright dots as in Fig. II-51, respectively.

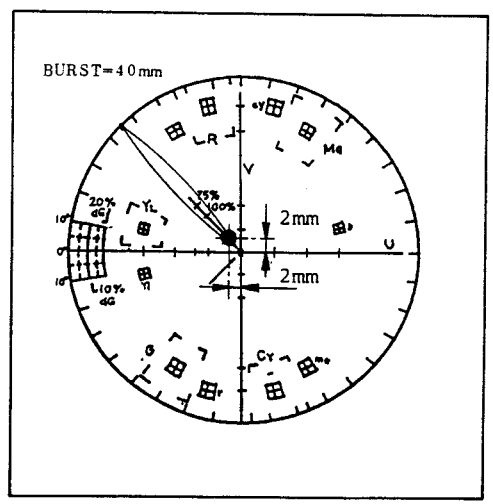


Fig. II-51

4-14 Full Auto White Balance Adjustment 3

CHART	White chart
M. EQ.	Vectorscope
TOOL	Halogen lamp
MODE	FAWB R+B PRO. C.B.A. TP2217(CH SEL)G ↔ TP2215(GND)E TP2219(FL TEST)F ↔ Open TP2220(WB PRESET)B ↔ TP2215(GND)E
ADJ.	VR2603(AWB R+B)

Procedures:

* Note: Do not turn VR excessively.

1) Shoot white chart with halogen lamp lighted.
2) Shift bright dot in direction of B-Y +. (VR2603)
3) Turn VR2603 reversely to above direction until bright dot comes to the position in Fig. II-52.

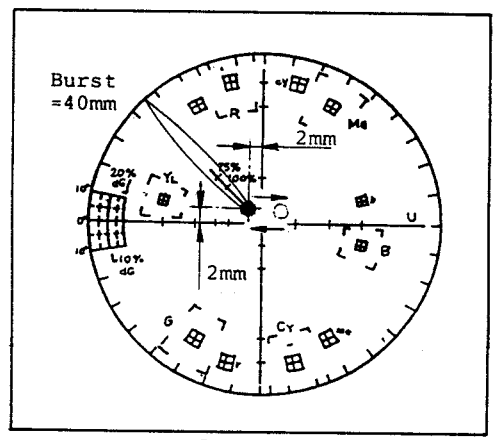


Fig. II-52

4-15 Chrominance Clip Adjustment

CHART	Frame chart (page II-3)
MODE	AWB PRESET
M. EQ.	Vectorscope
TOOL	Yellow filter
ADJ.	VR2209(C CLIP)

Procedures:

1) Shoot frame chart with standard angle of view.
2) Attach an yellow filter (DY9-2022-000).
3) Set burst to 27 mm.
4) Shift bright dot from the position ⓐ to ⓑ.

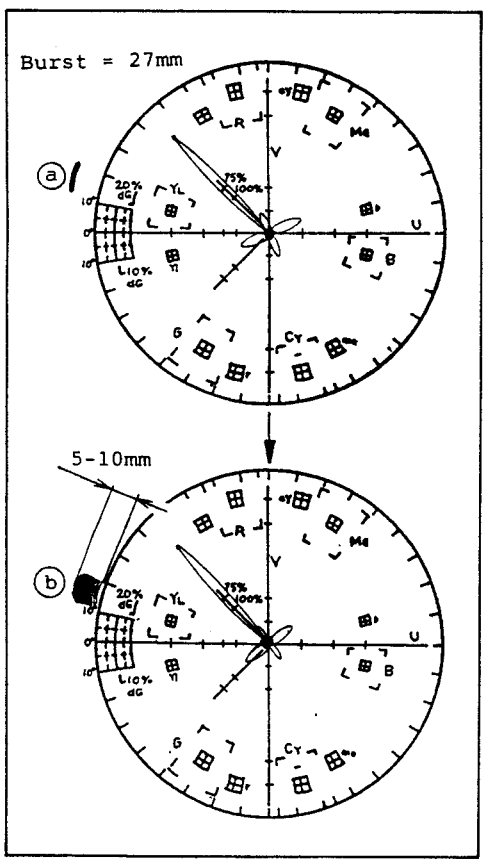


Fig. II-53

4-16 Blooming Adjustment

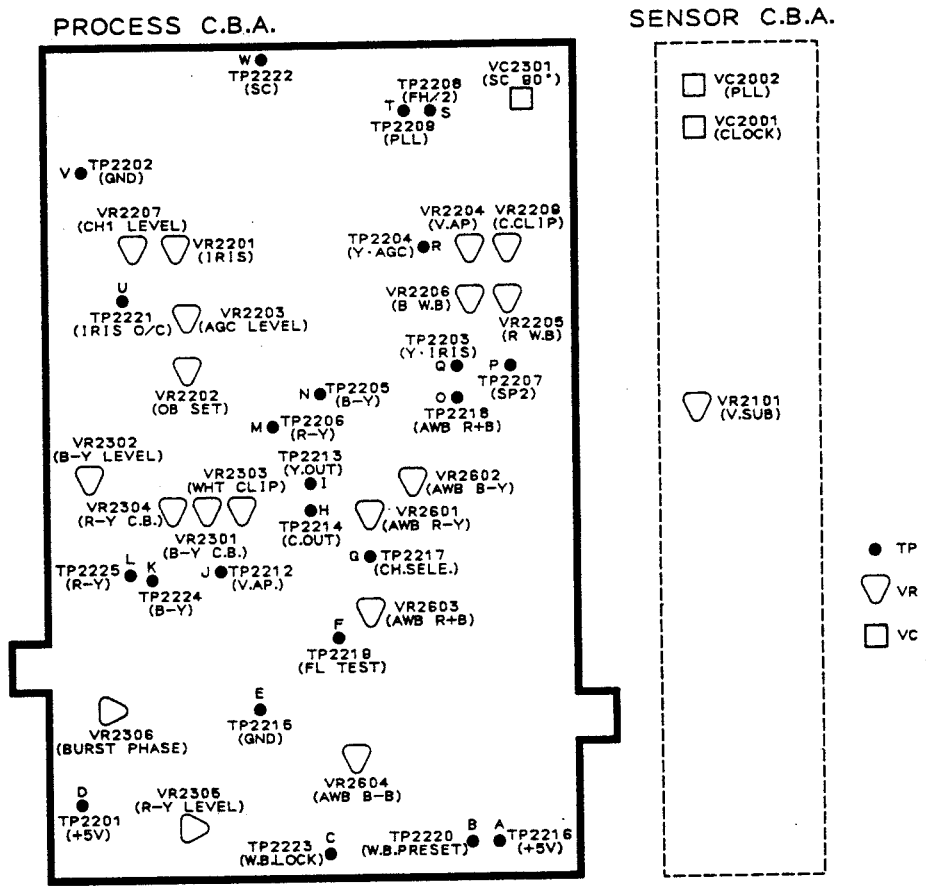
* Note: Perform this adjustment only when CCD/SENS C.B.A. replaced.

CHART	Halogen lamp (300W)
MODE	Iris opened PRO C.B.A. TP2221(IRIS O/C)U ⟷ TP2216(+5V)A
M. EQ.	Monitor TV
TOOL	ND filters (4, 8)
ADJ.	SENS C.B.A. VR2101(V.SUB)

Procedures:

1) Set halogen lamp 1.2-1.5 m away from front lens.
2) Attach ND filters 4+8 onto the lens.
3) Set zoom ring to telephoto end.
   Set focus ring to closest end.
4) Eliminate blooming on monitor TV.

4-17 Locations of TP/VR/VC



5. Adjustemnts (Recorder Section)

5-1 SS5V Adjustment

MODE	REC
M. EQ.	Digital voltmeter
TP/TRIG.	R-KEY1 C.B.A. CN004 Pin 6
ADJ.	SS C.B.A. VR601
SPEC.	5.1 ± 0.1V

5-2 AV5V Adjustment

MODE	STOP
M. EQ.	Digital voltmeter
TP/TRIG.	AV C.B.A. TP103
ADJ.	AV C.B.A. VR108
SPEC.	5.1 ± 0.1V

5-3 Undercut Adjustment

MODE	REC
M. EQ.	Digital voltmeter, Monitor TV.
ADJ.	SS C.B.A. VR602
SPEC.	80 ± 01H/5.75 ± 0.1V

Procedures:

1) Set voltages at pins 1-2 (CN612) to 5.75 ± 0.1V.
2) Turn on SERVICE-2 switch of R-KEY2 C.B.A.. (SERVICE Mode)
3) Turn VR until the spec. obtained.

5-4 ATF Bias Adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PB
M. EQ.	Monitor TV
ADJ.	SS C.B.A. VR401
SPEC.	80 ± 03H

Procedures:

1) Turn on SERVICE-2 switch of R-KEY2 C.B.A.. (SERVICE mode)
2) Short TP401(16K) and TP402(47K) of SS C.B.A. by using a capacitor. (Use a capacitor approx. 10 µF/10V.)
3) Turn VR until the spec. obtained.

5-5 Switching Point Adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	SS C.B.A. TP410 VIDEO C.B.A. TP108
ADJ.	SS-1 C.B.A. VR603
SPEC.	7H ± 1H

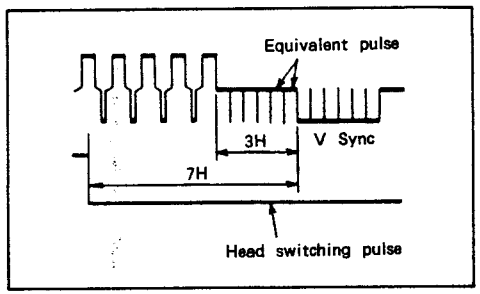


Fig. II-54

5-6 Y/C Separation Adjustment

SIGNAL	Color bar
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	AV C.B.A. TP112
ADJ.	AV C.B.A. VR112
SPEC.	Minimize chrominance component as possible.

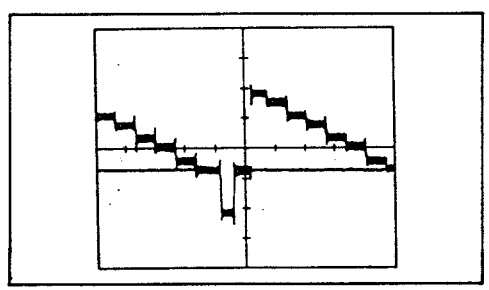


Fig. II-55 10 µs/20 mV

5-7 YFM Carrier Adjustment

SIGNAL	Black (Cut R.G. and B with raster.)
MODE	REC (SP)
M. EQ.	Oscilloscope
TP/TRIG.	AV C.B.A. TP106
ADJ.	AV C.B.A. VR110
SPEC.	0.24 µsec./1 cycle (4.2 MHz approx.)

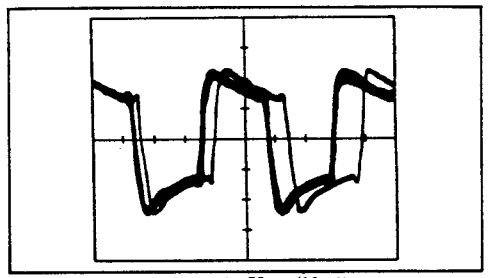


Fig. II-56 50 ns/10 mV

* Note: Use the signal waveform having longer cycle.

5-8 YFM Deviation Adjustment

SIGNAL	100% white video signal
MODE	REC (SP)
M. EQ.	Oscilloscope
TP/TRIG.	AV C.B.A. TP106
ADJ.	AV C.B.A. VR111
SPEC.	0.37µ sec./2 cycle (5.4 MHz approx.)

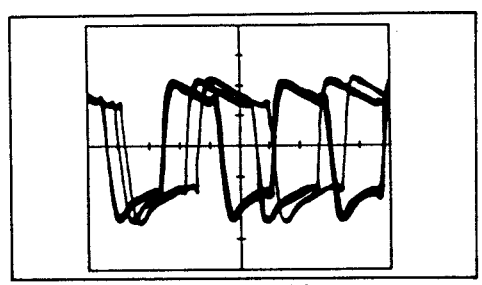


Fig. II-57 50 ns/10 mV

* Note: Use the signal waveform having the shortest cycle.

5-9 FM Audio Carrier Adjustment

SIGNAL	No signal (Terminal-opened)
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	AV C.B.A. TP113
ADJ.	AV C.B.A. VR102
SPEC.	1.5 ± 0.02 MHz

5-10 FM Audio Deviation Adjustment

SIGNAL	D.O. Adj..Master (DY9-1064-000)
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	PIN JACK C.B.A. CN003 Pin 2
ADJ.	AV C.B.A. VR101
SPEC.	890 ±50 mV

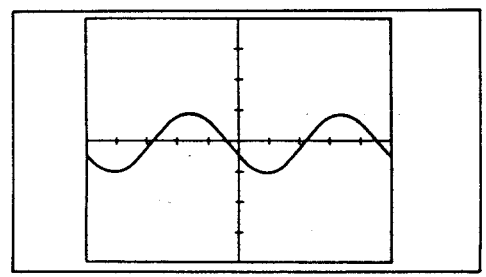


Fig. II-58 5 ms/50 mV

5-11 Recording Current Adjustment

(1) Luminance Signal

SIGNAL	No signal (Terminal-opened)
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	AV C.B.A. TP102
ADJ.	AV C.B.A. VR106
SPEC.	330 ± 10 mV

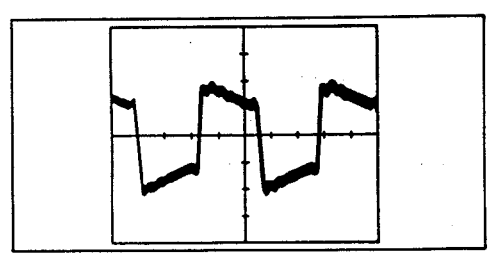


Fig. II-59 50 µs/10 mV

(2) Chrominance/Audio/ATF Signals

MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	AV C.B.A. TP102
TOOL	Recording current checker (DY9-1056-000)

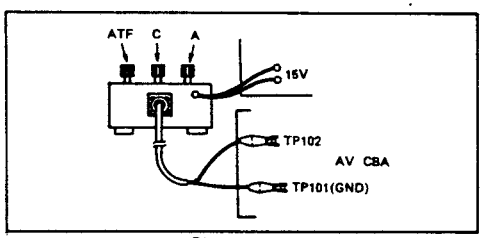


Fig. II-60

Chrominance

SIGNAL	Color bar
ADJ	AV C.B.A. VR105
SPEC.	2.6 Vp-p

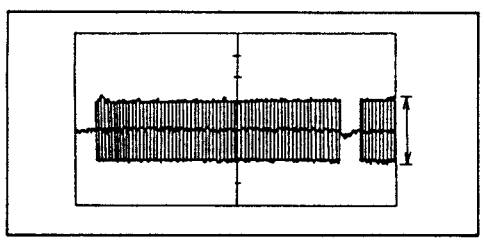


Fig. II-61 5 ms/50 mV

Audio

SIGNAL	No signal (Terminal-opened)
ADJ.	AV C.B.A. VR103
SPEC.	1.85 Vp-p

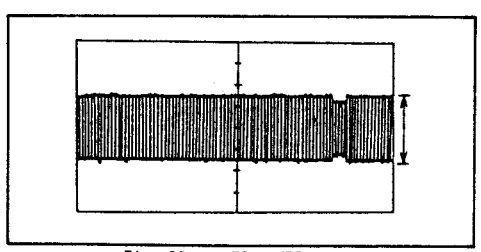


Fig. II-62 50 µs/50 mV

ATF

SIGNAL	Color bar
ADJ.	AV C.B.A. VR104
SPEC.	1.4 Vp-p

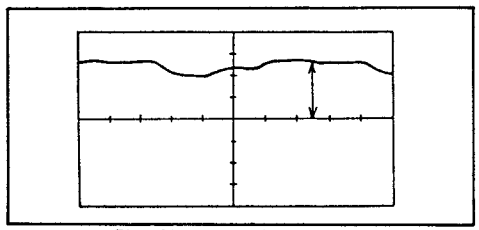


Fig. II-63 5 ms/50 mV DC

5-12 Playback Y Level Adjustment

SIGNAL	100% white video signal
MODE	PLAYBACK
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. TP108
ADJ.	VIDEO C.B.A. VR109
SPEC.	0.48 ± 0.02V

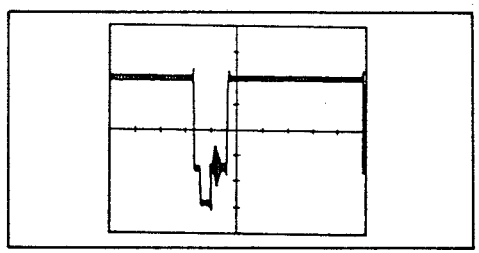


Fig. II-64

Procedures:

1) Record white 100% signal in SP mode.
2) Playback the recorded part.
   Then, adjust it as specified.

5-13 JOG Chrominance Phase Adjustment

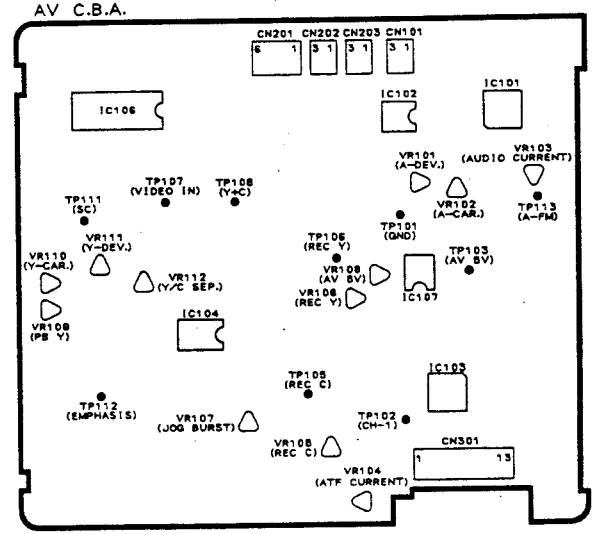
SIGNAL	Red signal (pattern generator)
MODE	Search
M. EQ	Monitor
ADJ.	VIDEO C.B.A. VR107
SPEC.	Eliminate the block stripes

Procedures:

1) Record red signal in LP mode.
2) Playback and search the recorded part.
3) Eliminate the black stripes on the screen.

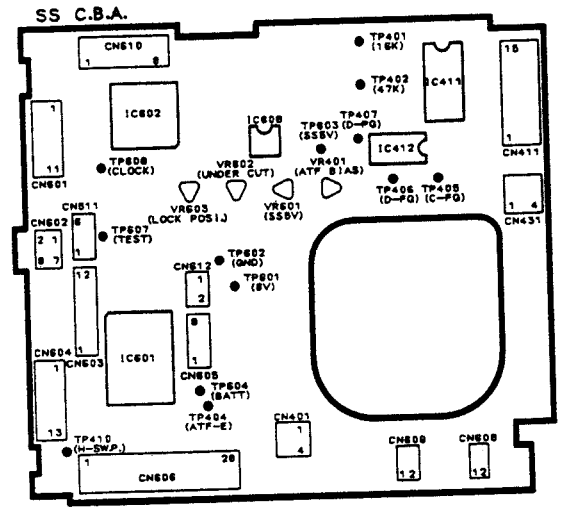
5-14 Locations of TP/VR VC

AV C.B.A.



TP101 GND	VR101 A-DEV.
102 CH-I	102 A-CAR.
103 AV5V	103 AUDIO CURRENT
105 REC C	104 ATF CURRENT
106 REC Y	105 REC C
107 VIDEO IN	106 REC Y
108 Y+C	107 JOG BURST
111 SC	108 AV5V
112 EMPHASIS	109 PB Y
113 A-FM	110 Y-CAR.
	111 Y-DEV.
	112 Y/C SEP.

SS C.B.A.



TP401 16K	VR401 ATF BIAS
402 47K	601 SS5V
404 ATF-E	602 UNDER CUT
405 C-FG	603 LOCK POSI.
406 D-FG	
407 D-PG	
410 H-SW.P.	
601 6V	
602 GND	
603 SS5V	
604 BATT	
607 TEST	
608 CLOCK	

6. Adjustment (EVF Section)

6-1 EVF 5V Adjustment

M. EQ.	Digital voltmeter
TP/TRIG.	GRIP C.B.A. TP2933
ADJ.	GRIP C.B.A. VR2931
SPEC.	5.1 ± 0.05V

6-2 Free-Run Frequency Adjustment

SIGNAL	No signal (Terminal-opened)
MODE	LINE IN
M. EQ.	Oscilloscope, Frequency counter
TP/TRIG.	GRIP C.B.A. TP2901
ADJ.	GRIP C.B.A. VR2901
SPEC.	15.90 ± 0.05 KHz

6-3 Vertical Amplitude Adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PLAY
M. EQ.	EVF, Monitor TV
ADJ.	GRIP C.B.A. VR2902
SPEC.	No distortion in the circle pattern on monoscope master. Comparing circle pattern image or monoscope master with that on monitor TV, make sure there is no noticeable difference between them.

6-4 Rotation & Centering Adjustments

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PLAY
M. EQ.	EVF
ADJ.	Deflection yoke, Centering magnet
SPEC.	No tilt on pattern image and centered correctly.

Procedures:

1) Loosen the clamp ring of deflection yoke so that the yoke can be turned.
2) Turn the deflection yoke to correct for tilt of pattern image.

* Note: Hold the deflection yoke to the stop position on CRT screen side.

3) Tighten the clamp ring.

* Note: Clamp ring should be tightened to such an extent that the centering magnet can be moved.

4) Adjust the centering magnet for centering the pattern image.
5) Tighten the clamp ring securely.

* Note: Take care not to overtighten.

6) Fix the centering magnet with a bit of lock paint or adhesive.
(At two points that are apart by 180° from each other.)

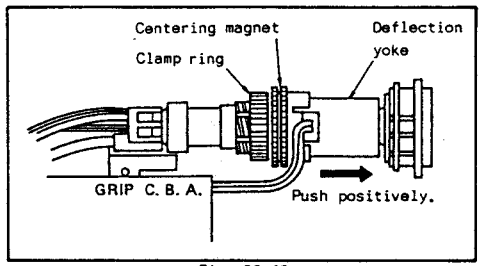


Fig. II-65

6-5 Character Position Adjustment (Character Generator)

SIGNAL	PAL signal
MODE	CAMERA E-E or VIDEO IN, REC PAUSE
ADJ.	VC2941
SPEC.	Letter "E" positioned approx. 0.7-1.0mm apart from the right edge of CRT mask.

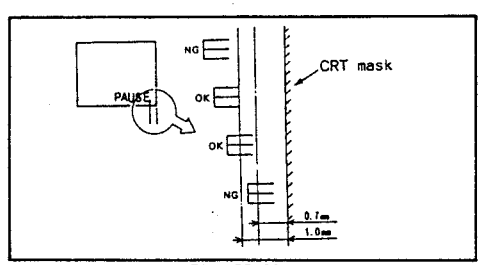


Fig. II-66

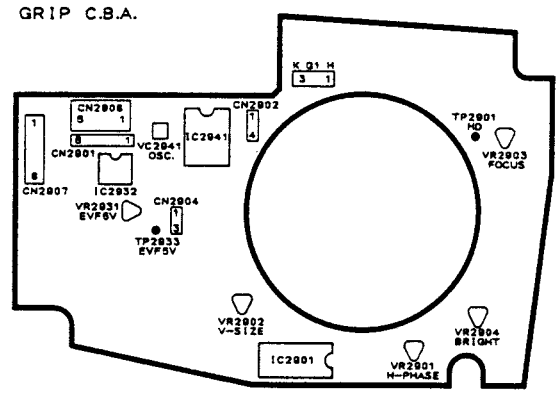
6-6 Brightness Adjustment

SIGNAL	Grayscale recorded on tape
MODE	PLAY
M. EQ.	EVF
ADJ.	VR2904
SPEC.	Up to ten steps of grayscale should be identifiable.

6-7 Focusing Adjustment

MODE	REC PAUSE (Lens closed)
M. EQ.	EVF
ADJ.	VR2903
SPEC.	REC PAUSE on EVF displayed clearly

6-8 Locations of TP/VR VC



TP2901 HD
2933 EVF 5V

VR2901 H-PHASE
2902 V-SIZE
2903 FOCUS
2904 BRIGHT
2931 EVF 5V
VC2941 OSC.

CONTENTS

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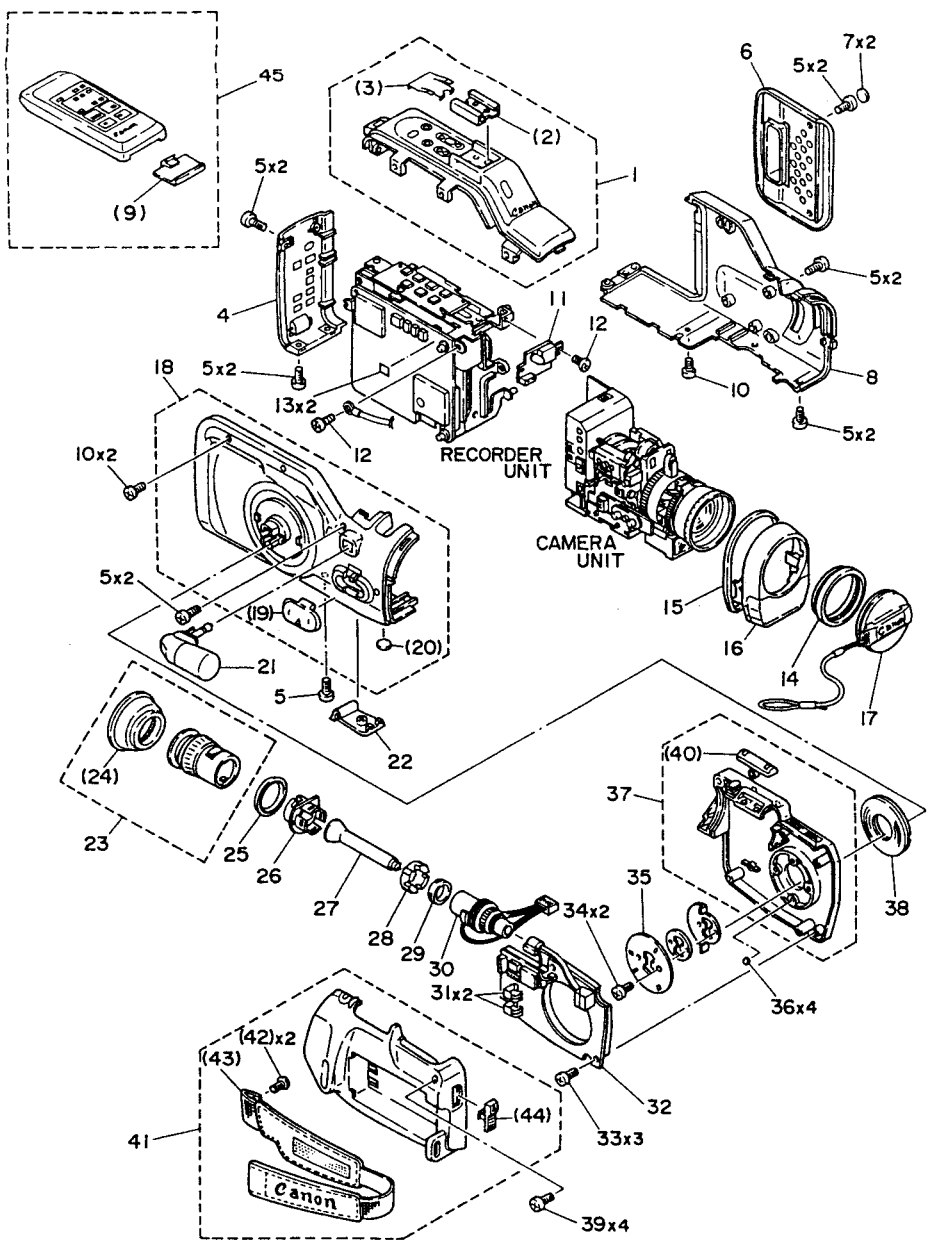
ELECTRICAL PARTS LIST ..... Ⅲ－13

PARTS LIST ..... Ⅲ－20

1. ESPECIALLY CRITICAL PARTS IN THE POWER CIRCUIT BLOCK SHOULD NOT BE REPLACED WITH OTHER MARKS.
   CRITICAL PARTS ARE MARKED WITH ⚠ IN THIS ELECTRICAL PARTS LIST.

2. THE NUMBERS INDICATED ON THE CONNECTORS DO NOT CORRESPOND TO THE SYMBOL NUMBERS.
   PLEASE CHECK THE CORRECT SYMBOL NUMBERS OF THE CONNECTORS ON THE INTERCONNECTION SCHEMATIC DIAGRAM.

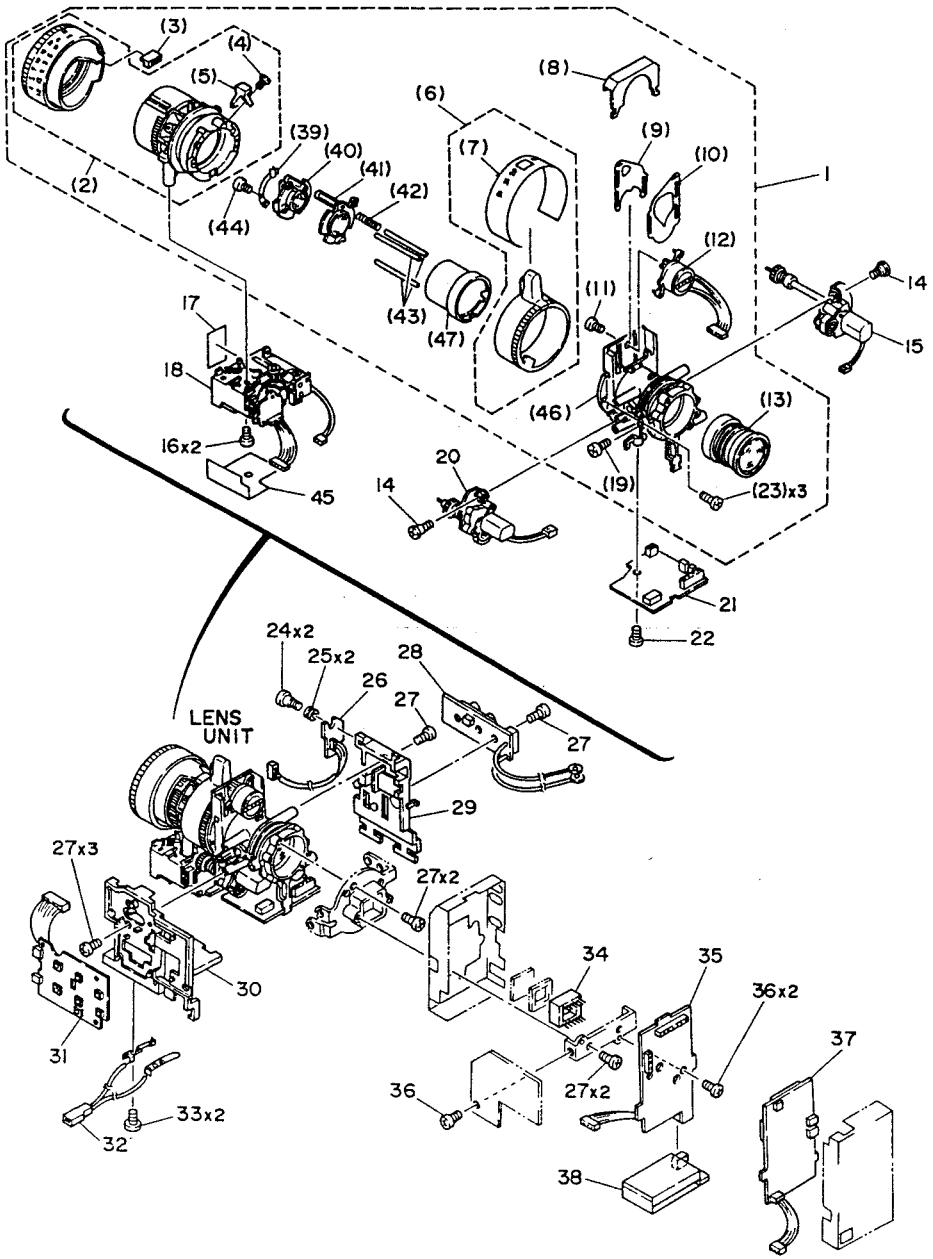
Casing Parts Section



MECHANICAL PARTS

	SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	1	DY2-1087-000 000	B	1	TOP COVER ASS'Y	E80E ONLY
		DY2-1088-000 000	B	1	TOP COVER ASS'Y	E80F ONLY
	2	DA1-1557-000 000	B	1	ACCESSORY, SHOE	
	3	DA1-1598-000 000	B	1	SPRING, ACCESSORY SHOE	
	4	DY2-1091-000 000	B	1	REAR COVER ASS'Y	E80E ONLY
		DY2-1092-000 000	B	1	REAR COVER ASS'Y	E80F ONLY
	5	XA1-7200-459 000	F	13	SCREW, CROSS-RECESS, PH	
	6	DF1-0431-000 000	C	1	COVER, CASSETTE	E80E ONLY
		DF1-0432-000 000	C	1	COVER, CASSETTE	E80F ONLY
	7	DA1-1840-000 000	A	2	SEAL	
	8	DY2-1089-000 000	B	1	RIGHT COVER ASS'Y	E80E ONLY
		DY2-1090-000 000	B	1	RIGHT COVER ASS'Y	E80F ONLY
	9	Y22-2311-000 000	B	1	COVER WIRELESS CONTROLLER	
	10	XA1-7200-359 000	F	3	SCREW, CROSS-RECESS, PH	
	11	DG1-0485-000 000	C	1	REMOCON C.B.A.	
	12	XA1-7200-357 000	F	2	SCREW, CROSS-RECESS, PH	
	13	DA1-2147-000 000	C	2	CUSHION	
	14	DA1-1702-000 000	B	1	HOOD	
	15	DA1-1835-000 000	C	1	RING, RUBBER	
	16	DY2-1068-000 000	B	1	FILTER, INFRARED	
	17	DF1-0406-060 000	B	1	CAP, LENS	
	18	DY2-1101-000 000	B	1	LEFT COVER ASS'Y	
	19	DA1-1848-000 000	B	1	COVER, RF	
	20	DA1-1940-000 000	C	1	SEAL, PC	
	21	DH9-0389-000 000	C	1	MICROPHONE	
	22	DA1-1834-000 000	B	1	COVER, BATTERY	
	23	DG1-0498-000 000	B	1	FINDER ASS'Y	
	24	DA1-1573-000 000	B	1	EYE CAP RUBBER	
	25	DA1-1864-000 000	B	1	RING, RUBBER	
	26	DA1-1854-000 000	C	1	MASK, CRT	
⚠	27	DH9-0323-000 000	D	1	CRT	
	28	DA1-1855-000 000	C	1	RUBBER, MASK	
	29	DA1-1856-000 000	C	1	HOLDER, MASK	
	30	DH9-0393-000 000	C	1	DEFRECTION YOKE	
	31	DA1-1853-000 000	C	2	TERMINAL, BATTERY	
	32	DG1-0550-000 000	C	1	GRIP C.B.A.	
	33	XA4-7200-459 000	F	3	SCREW, CROSS-RECESS, PH	
	34	XB1-1300-809 000	F	2	SCREW	
	35	DA1-1862-000 000	C	1	PLATE	
	36	DA1-1931-000 000	C	4	STEEL BALL, SUJ (2)	
	37	DY1-1065-000 000	B	1	RIGHT COVER, GRIP	E80E ONLY
		DY1-1066-000 000	B	1	RIGHT COVER, GRIP	E80F ONLY
	38	DF1-0449-000 000	C	1	PLATE, GRIP	
	39	XA1-7260-709 000	F	4	SCREW, CROSS-RECESS, PH	
	40	DA1-1860-000 000	C	1	TELE WIDE KNOB	
	41	DY2-1071-000 000	B	1	LEFT COVER, GRIP	
	42	XA9-0435-010 000	F	2	SCREW, CROSS-RECESS, PH	
	43	DA1-1866-000 000	B	1	STRAP, HAND	
	44	DA1-1857-000 000	C	1	KNOB, BATTERY	
	45	DY2-6014-000 000	C	1	WIRELESS CONTROLLER	E80E ONLY
		DY2-6016-000 000	C	1	WIRELESS CONTROLLER	E80F ONLY

Lens/Camera Unit Section

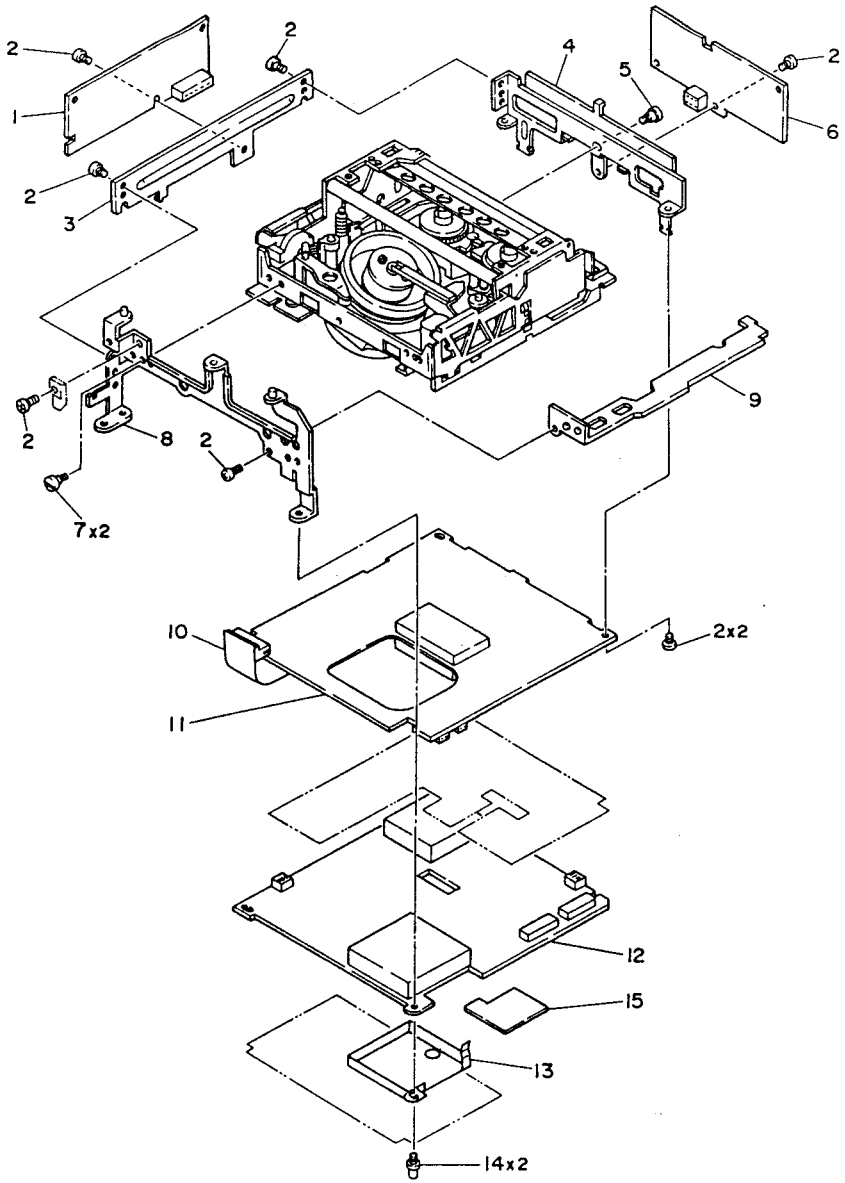


MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY1-7098-000 000	C	1	ZOOM LENS ASS'Y	
2	DY1-7100-000 000	C	1	FOCUS LENS ASS'Y	
3	DA7-1734-000 000	C	1	STOPPER, RUBBER	
4	XA4-4200-507 000	F	1	SCREW, CROSS-RECESS, PH	
5	DA7-1724-000 000	C	1	STOPPER, NEARDISTANCE	
6	DG9-3382-000 000	C	1	ZOOM RING ASS'Y	
7	DA7-1728-000 000	C	1	SHEET, ZOOM	
8	DA7-1739-000 000	C	1	COVER, IG METER	
9	DF7-0227-000 000	C	1	BLIND, IG METER (B)	
10	DA7-1730-000 000	C	1	BLIND, IG METER (A)	
11	XA4-4170-407 000	F	1	SCREW, CROSS-RECESS, PH	
12	DH8-0043-000 000	C	1	IG METER	
13	DG9-3306-000 000	C	1	RELAY LENS ASS'Y	
14	X96-1723-610 000	F	2	SCREW, SLOTTED, SHOULDER	
15	DG9-3310-000 000	C	1	AF MOTOR ASS'Y D.C. 10W UNDER	
16	XA4-2170-707 000	F	2	SCREW, CROSS-RECESS, PH	
17	DA7-1738-000 000	C	1	SHIELD, LIGHT	
18	DY1-7097-000 000	C	1	AF BLOCK ASS'Y	*
19	XB4-6260-607 000	F	1	SCREW M2.6x6	
20	DG9-3311-000 000	C	1	PZ MOTOR ASS'Y D.C. 10W UNDER	
21	DG9-3372-000 000	C	1	AF MAIN C.B.A.	
22	XA4-4170-507 000	F	1	SCREW, CROSS-RECESS, PH	
23	XA4-9170-557 000	F	3	SCREW, CROSS-RECESS, PH	
24	DA1-1815-000 000	C	2	SCREW	
25	DA1-1811-000 000	C	2	CUSHION, RUBBER	
26	DG1-0499-000 000	C	1	MIC. JACK C.B.A.	
27	XA4-9200-609 000	F	9	SCREW, CROSS-RECESS, PH	
28	DG1-0486-000 000	C	1	PIN. JACK C.B.A.	
29	DA1-1802-000 000	C	1	HOLDER, CAMERA 2	
30	DF1-0448-000 000	C	1	HOLDER, CAMERA 1	
31	DG1-0484-010 000	C	1	CAMERA KEY C.B.A.	
32	DF1-0436-010 000	C	1	CONTACT, BATTERY	
33	XA4-9200-209 000	F	2	SCREW	
34	DH4-0206-000 000	B	1	CCD MN3745FC	
35	DG1-0533-000 000	C	1	SENSOR C.B.A.	
36	XA1-7200-357 000	F	3	SCREW, CROSS-RECESS, PH	
37	DG1-0534-000 000	C	1	PROCESS C.B.A.	
38	DH3-0011-000 000	C	1	DC/DC CONVERTER	
39	DA7-1727-000 000	C	1	SPRING, PLATE	
40	DG9-3340-000 000	C	1	VARIATOR LENS ASS'Y	
41	DG9-3341-000 000	C	1	COMPENSATOR LENS ASS'Y	
42	DS1-5178-000 000	C	1	SPRING, COIL	
43	DA7-1620-000 000	C	1	BAR, ZOOMING	
44	XA4-4170-409 000	F	1	SCREW, CROSS-RECESS, PH	
45	DA1-2138-000 000	C	1	SHEET	
46	DG9-3342-000 000	C	1	RELAY HOLDER ASS'Y	
47	DA7-1717-000 000	C	1	ZOOM CAM	

* Be sure to attach SHIELD, LIGHT (No.17) after replacing AF BLOCK ASS'Y (No.18).

Recorder Unit Section

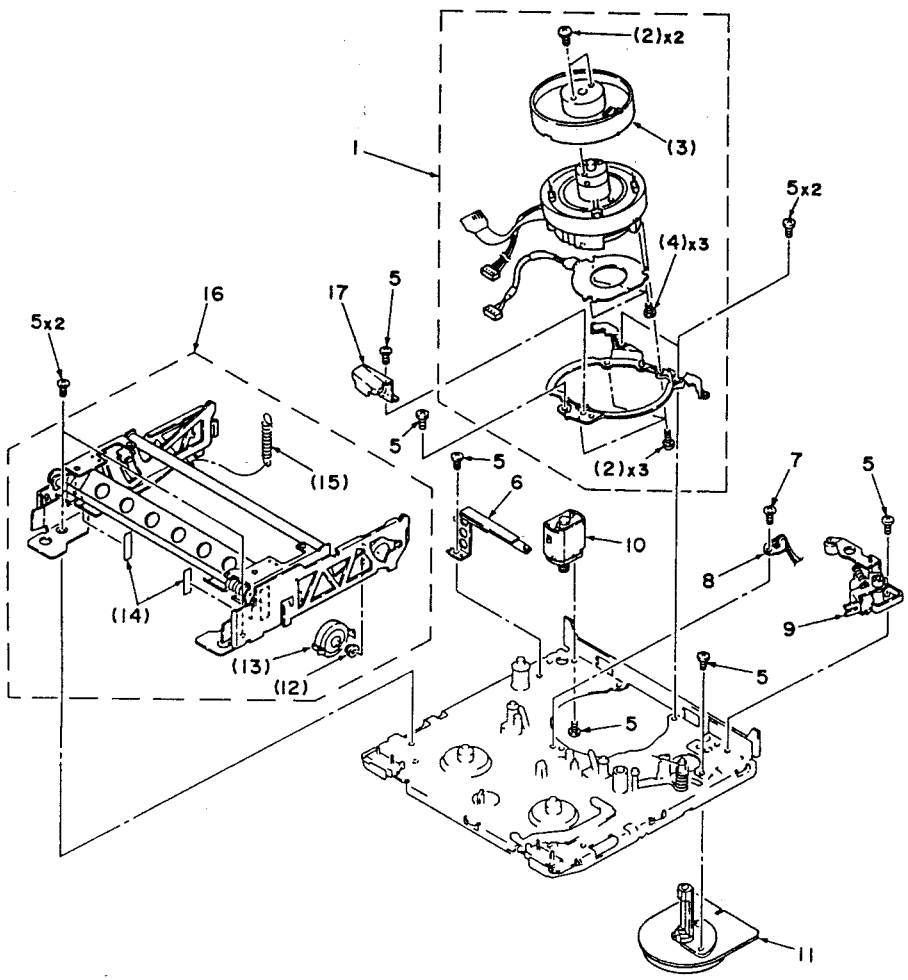


MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DG1-0477-000 000	C	1	RECORDER KEY (1) C.B.A.	
2	XA1-7200-357 000	F	8	SCREW, CROSS-RECESS, PH	
3	DA1-1822-000 000	C	1	HOLDER, RECORDER (3)	
4	DF1-0443-000 000	C	1	HOLDER, RECORDER (2)	
5	DA1-1900-000 000	C	1	SCREW	
6	DG1-0478-000 000	C	1	RECORDER KEY (2) C.B.A.	*
7	DA1-1948-000 000	C	2	SCREW	
8	DF1-0442-000 000	C	1	HOLDER, RECORDER (1)	
9	DA1-1945-000 000	C	1	HOLDER, RECORDER (4)	
10	DF1-0444-000 000	C	1	PRINTED CORD P.I. W/CONNECTOR	
11	DG1-0529-000 000	C	1	SYSCON SERVO C.B.A.	
12	DG1-0530-000 000	C	1	AUDIO VIDEO C.B.A.	
13	DA1-1884-000 000	C	1	CASE, SHIELD	
14	DA1-1895-000 000	F	2	SCREW	
15	DG1-0525-001 000	C	1	CT C.B.A.	

* When the RECORDER KEY (2) C.B.A (No.6) is replaced, switch SW002 over to the language according to your necessity.

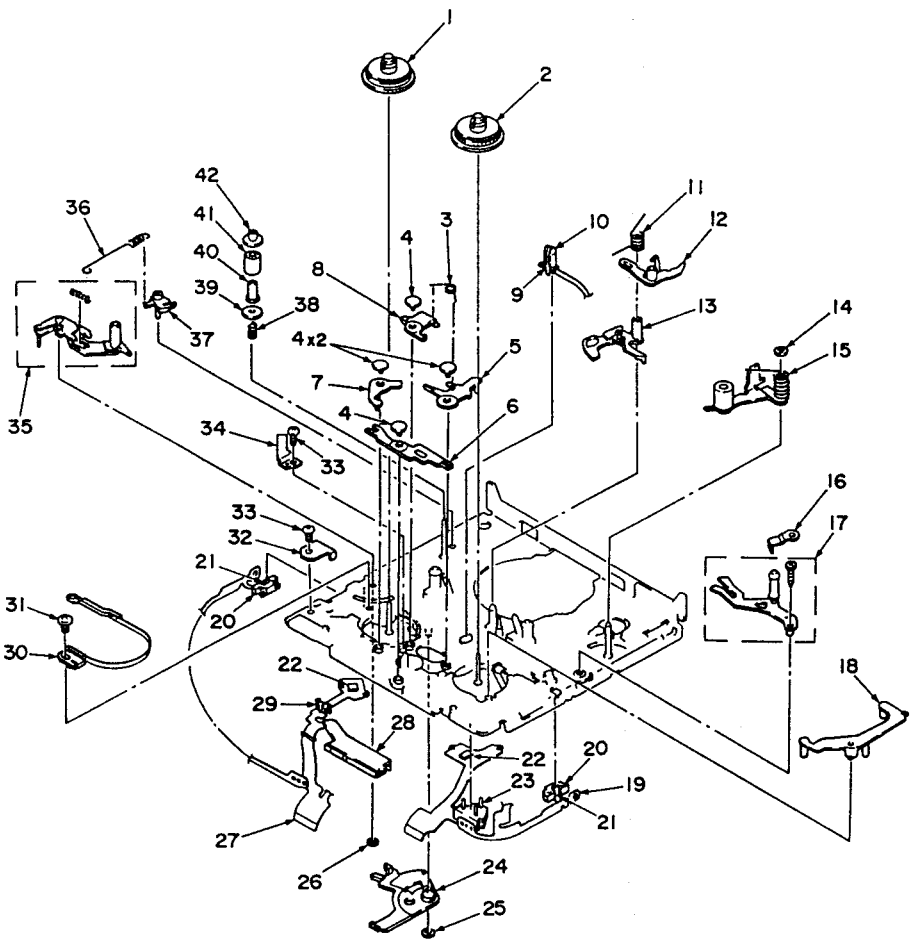
Mechanical Chassis Section I



MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2732-000 000	E	1	DRUM ASS'Y	
2	DY4-2730-000 000	F	5	SCREW	
3	DY4-2733-000 000	E	1	UPPER DRUM ASS'Y	
4	DY4-2452-000 000	F	3	SCREW	
5	DY4-2727-000 000	F	10	SCREW	
6	DY4-2675-000 000	C	1	TERMINAL, EARTH	
7	DY4-2728-000 000	F	1	SCREW	
8	Y22-8120-000 000	B	1	SENSOR, DEW	
9	DY4-2652-000 000	C	1	ROLLER ASS'Y	
10	DY4-2651-000 000	C	1	LOADING MOTOR ASS'Y	
11	DY4-2726-000 000	C	1	CAPSTAN MOTOR	
12	DY4-2720-000 000	C	1	DAMPER, OIL	
13	DY4-2709-000 000	C	1	GEAR, DAMPER	
14	DY4-2729-000 000	C	2	TAPE	
15	DY4-2708-000 000	C	1	SPRING, COIL	
16	DY4-2673-000 000	C	1	CASSETTE COMPARTMENT ASS'Y	
17	DY4-2721-000 000	C	1	GUARD, GUIDE	

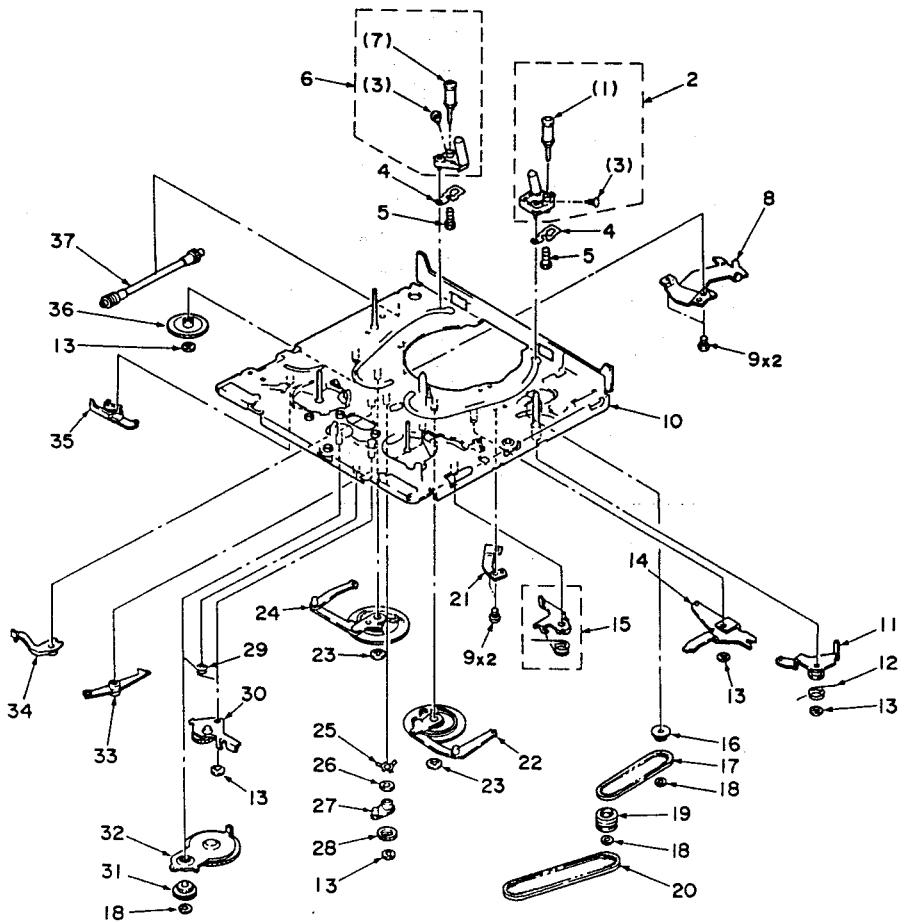
Mechanical Chassis Section 2



MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2663-000 000	C	1	REEL, SUPPLY	
2	DY4-2666-000 000	C	1	REEL, TAKE UP	
3	DY4-2699-000 000	C	1	SPRING, COIL	
4	DY4-2696-000 000	C	1	PIN, SHAFT	
5	DY4-2714-000 000	C	1	BRAKE, T	
6	DY4-2692-000 000	C	1	LEVER, LB	
7	DY4-2691-000 000	C	1	BRAKE, LB	
8	DY4-2713-000 000	C	1	BRAKE, S	
9	DY4-2710-000 000	C	1	HOLDER, LED	
10	Y22-8012-000 000	B	1	LED GL452S	
11	DY4-2697-000 000	C	1	SPRING, COIL	
12	DY4-2716-000 000	C	1	ARM, STOPPER	
13	DY4-2723-000 000	C	1	STOPPER, RK	
14	DY4-2440-000 000	F	1	WASHER	
15	DY4-2653-000 000	C	1	ARM, PINCH	
16	DY4-2707-000 000	C	1	SPRING, PLATE	
17	DY4-2664-000 000	C	1	ARM, TG7	
18	DY4-2712-000 000	C	1	ARM RELEASE	
19	DY4-2680-000 000	C	1	FLEXIBLE C.B.A. (2)	
20	DY4-2722-000 000	C	2	HOLDER, SENSOR	
21	Y22-8123-000 000	B	2	PHOTO TRANSISTOR EE-P109	
22	Y22-8121-000 000	B	2	SENSOR, PHOTO TLP907-0	
23	DY4-2678-000 000	C	1	SWITCH, PUSH	
24	DY4-2657-000 000	C	1	LEVER, SWITCH	
25	DY4-2688-000 000	F	1	WASHER	
26	DY4-2681-000 000	F	1	WASHER	
27	DY4-2679-000 000	C	1	FLEXIBLE C.B.A. (1)	
28	DY4-2677-000 000	C	1	SWITCH, SLIDE	
29	DY4-2676-000 000	C	1	SWITCH	
30	DY4-2660-000 000	C	1	BAND, TENSION	
31	DY4-2727-000 000	F	1	SCREW	
32	DY4-2725-000 000	C	1	PLATE, SWITCH	
33	DY4-2728-000 000	F	2	SCREW	
34	DY4-2690-000 000	C	1	PLATE, TL	
35	DY4-2669-000 000	C	1	ARM	
36	DY4-2724-000 000	C	1	SPRING, COIL	
37	DY4-2717-000 000	C	1	ARM, ADJUST	
38	DY4-2705-000 000	C	1	SPRING, COIL	
39	DY4-2701-000 000	C	1	FRANGE, TG2	
40	DY4-2704-000 000	C	1	SLEEVE, TG2	
41	DY4-2702-000 000	C	1	ROLLER, TG2	
42	DY4-2703-000 000	C	1	FRANGE, TG2	

Mechanical Chassis Section 3



MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2674-000 000	C	1	ROLLER, GUIDE	
2	DY4-2649-000 000	C	1	COASTER, RIGHT	
3	DY4-2686-000 000	F	2	SCREW	
4	DY4-2685-000 000	C	2	SPRING, LEAF	
5	DY4-2689-000 000	F	2	SCREW	
6	DY4-2648-000 000	C	1	COASTER, LEFT	
7	DY4-2662-000 000	C	1	ROLLER	
8	DY4-2672-000 000	C	1	PLATE, SS	
9	DY4-2728-000 000	F	4	SCREW	
10	DY4-2670-000 000	C	1	CHASSIS ASS'Y	
11	DY4-2665-000 000	C	1	ARM, PINCH SUB	
12	DY4-2706-000 000	C	1	SPRING, COIL	
13	DY4-2688-000 000	F	5	WASHER	
14	DY4-2655-000 000	C	1	LEVER, THREADING	
15	DY4-2659-000 000	C	1	BRAKE, TS	
16	DY4-2656-000 000	C	1	GEAR, JOINT	
17	DY4-2719-000 000	E	1	BELT (S), TIMING	
18	DY4-2681-000 000	F	3	WASHER	
19	DY4-2671-000 000	C	1	PULLY, RELAY	
20	DY4-2718-000 000	E	1	BELT (L), TIMING	
21	DY4-2684-000 000	C	1	PLATE, TT	
22	DY4-2668-000 000	C	1	GEAR	
23	DY4-2440-000 000	F	2	WASHER	
24	DY4-2667-000 000	C	1	GEAR	
25	DY4-2700-000 000	C	1	SPRING	
26	DY4-2527-000 000	F	1	WASHER	
27	DY4-2695-000 000	C	1	ARM, UL	
28	DY4-2694-000 000	C	1	GEAR, UL	
29	DY4-2698-000 000	C	1	SPRING, COIL	
30	DY4-2650-000 000	C	1	GEAR, ASS'Y	
31	DY4-2661-000 000	C	1	GEAR	
32	DY4-2654-000 000	C	1	GEAR, ASS'Y	
33	DY4-2693-000 000	C	1	ARM, RELEASE	
34	DY4-2715-000 000	C	1	BRAKE, UL	
35	DY4-2711-000 000	C	1	LEVER, EJECT	
36	DY4-2687-000 000	C	1	GEAR, WHEEL	
37	DY4-2658-000 000	C	1	WORM ASS'Y	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
C113	VC5-5030-474 000	C	1	CAPACITOR, TANTA. 0.47µF 20V	
C121	VC5-0070-225 000	C	1	CAPACITOR, TANTA. 2.2µF 6.3V	
C131	VC5-0070-225 000	C	1	CAPACITOR, TANTA. 2.2µF 6.3V	
C139	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C149	VC5-9860-334 000	C	1	CAPACITOR, TANTA. 0.33µF 25V	
C150	VC5-0700-225 000	C	1	CAPACITOR, TANTA. 2.2µF 10V	
C162	VC6-4310-336 000	C	1	CAPACITOR, TANTA. 33µF 10V	
C175	VC5-0090-473 000	C	1	CAPACITOR, TANTA. 0.047µF 35V	
C200	VC5-0700-226 000	C	1	CAPACITOR, TNATA. 22µF 10V	
C238	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C240	VC5-0700-106 000	C	1	CAPACITOR, TANTA. 10µF 10V	
C248	VC5-5030-474 000	C	1	CAPACITOR, TANTA. 0.47µF 20V	
C250	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C287	VC5-5030-474 000	C	1	CAPACITOR, TANTA. 0.47µF 20V	
C290	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C291	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C292	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C293	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C296	VC5-0070-335 000	C	1	CAPACITOR, TANTA. 3.3µF 6.3V	
C298	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C299	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C305	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C309	VC5-0090-104 000	C	1	CAPACITOR, TANTA. 0.1µF 35V	
C310	VC5-0070-335 000	C	1	CAPACITOR, TANTA. 3.3µF 6.3V	
C311	VC5-0700-105 000	C	1	CAPACITOR, TANTA. 1µF 10V	
C605	VC6-4300-226 000	C	1	CAPACITOR, TANTA. 22µF 16V	
C607	VC6-4300-226 000	C	1	CAPACITOR, TANTA. 22µF 16V	
C608	VC5-5030-474 000	C	1	CAPACITOR, TANTA. 0.47µF 20V	
C614	VC6-4300-226 000	C	1	CAPACITOR, TANTA. 22µF 16V	
C617	VC6-4310-336 000	C	1	CAPACITOR, TANTA. 33µF 10V	
C623	VC5-5030-474 000	C	1	CAPACITOR, TANTA. 0.47µF 20V	
C2008	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 10V	
C2014	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 16V	
C2021	VC5-0070-225 000	C	1	CAPACITOR, TANTA. 2.2µF 6.3V	
C2066	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 16V	
C2109	VC5-5050-226 000	C	1	CAPACITOR, TANTA. 22µF 16V	
C2110	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 16V	
C2232	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 16V	
C2304	VC5-0070-226 000	C	1	CAPACITOR, TANTA. 22µF 6.3V	
C2307	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 16V	
C2615	VC5-0070-225 000	C	1	CAPACITOR, TANTA. 2.2µF 6.3V	
C2625	VC5-0070-225 000	C	1	CAPACITOR, TANTA. 2.2µF 6.3V	
C2701	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 16V	
C2705	VC5-5050-475 000	C	1	CAPACITOR, TANTA. 4.7µF 16V	
C2903	VC5-8150-684 202	C	1	CAPACITOR, TANTA. 0.68µF 20V	
C2904	VC9-9046-000 000	C	1	CAPACITOR, TANTA. 0.68µF 20V	
C2910	VC5-8160-224 000	C	1	CAPACITOR, TANTA. 0.22µF 35V	
C2915	VC5-9850-472 000	C	1	CAPACITOR, FILM 4700pF 100V	
C2917	VC5-9520-102 000	C	1	CAPACITOR, CERA. 1000pF 1KV	
C2918	VC6-1570-152 000	C	1	CAPACITOR, CERA. 1500pF 500V	
C2934	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 16V	
C2944	VC5-0700-225 000	C	1	CAPACITOR, TANTA. 2.2µF 10V	
C2954	VC5-5050-106 000	C	1	CAPACITOR, TANTA. 10µF 16V	
CN002,(LITHIUM)/CN611	DH2-0944-040 000	C	1	CONNECTOR ASS'Y 6P	
CN003/CN201	DF1-0446-000 000	C	1	CONNECTOR ASS'Y 6P	
CN202/CN2904	DH2-0951-000 000	C	1	CONNECTOR ASS'Y 3P	
CN203/CN2205	DH2-0952-000 000	C	1	CONNECTOR ASS'Y 3P	
CN302,3/CN606	DH2-0957-000 000	C	1	PRINTED CODE P.I.	
CN603/CN2204, CW2701	DH2-0945-050 000	C	1	CONNECTOR ASS'Y 12P	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
CN605/CN2901	DH2-0946-000 000	C	1	CONNECTOR ASS'Y 8P	
CN612,CN2001/CN2907	DH2-0947-000 000	C	1	CONNECTOR ASS'Y 6P	
CN2002	VS1-0851-016 000	C	1	CONNECTOR 16P	
CN2003	VS1-0851-009 000	C	1	CONNECTOR 9P	
CN2201	VS1-0850-009 000	C	1	CONNECTOR 9P	
CN2202	VS1-0850-016 000	C	1	CONNECTOR 16P	
CN4006/(CN2907)	DH2-0962-000 000	C	1	CONNECTOR ASS'Y 2P	
D101	WA1-0380-000 000	B	1	DIODE MA157	
D102	WA1-0380-000 000	B	1	DIODE MA157	
D103	WA1-0380-000 000	B	1	DIODE MA157	
D104	WA1-0380-000 000	B	1	DIODE MA157	
D106	WA1-0961-000 000	B	1	DIODE MA112	
D107	WA1-0961-000 000	B	1	DIODE MA112	
D108	WA1-0961-000 000	B	1	DIODE MA112	
D109	WA1-0547-000 201	B	1	DIODE 1SS184	
D110	WA1-0961-000 000	B	1	DIODE MA112	
D111	WA1-0547-000 201	B	1	DIODE 1SS184	
D401	WA1-0612-000 201	B	1	DIODE E10QS03	
D402	WA1-0612-000 201	B	1	DIODE E10QS03	
D411	WA1-0961-000 000	B	1	DIODE MA112	
D601	WA1-0961-000 000	B	1	DIODE MA112	
D602	WA1-0547-000 201	B	1	DIODE 1SS184	
D603	WA1-0547-000 201	B	1	DIODE 1SS184	
D604	WA1-0961-000 000	B	1	DIODE MA112	
D605	WA1-0961-000 000	B	1	DIODE MA112	
D606	WA1-0961-000 000	B	1	DIODE MA112	
D607	WA1-0961-000 000	B	1	DIODE MA112	
D610	WA1-0961-000 000	B	1	DIODE MA112	
D611	WA1-0384-000 000	B	1	ZENER DIODE RD5.6MB2	
D612	WA1-0547-000 201	B	1	DIODE 1SS184	
D614	WA1-0961-000 000	B	1	DIODE MA112	
D616	WA1-0961-000 000	B	1	DIODE MA112	
D617	WA1-0961-000 000	B	1	DIODE MA112	
D618	WA1-0547-000 201	B	1	DIODE 1SS184	
D619	WA1-0961-000 000	B	1	DIODE MA112	
D620	WA1-0961-000 000	B	1	DIODE MA112	
D621	WA1-0961-000 000	B	1	DIODE MA112	
D622	WA1-1146-000 000	B	1	DIODE MA707	
D623	WA1-1146-000 000	B	1	DIODE MA707	
D624	WA1-0961-000 000	B	1	DIODE MA112	
D2001	WA1-0961-000 000	B	1	DIODE MA112	
D2002	WA1-0985-000 000	B	1	DIODE MA341	
D2051	WA1-0380-000 000	B	1	DIODE MA157	
D2052	WA1-0961-000 000	B	1	DIODE MA112	
D2053	WA1-0962-000 000	B	1	DIODE MA121	
D2054	WA1-0962-000 000	B	1	DIODE MA121	
D2055	WA1-0961-000 000	B	1	DIODE MA112	
D2201	WA1-0961-000 000	B	1	DIODE MA112	
D2204	WA1-0961-000 000	B	1	DIODE MA112	
D2301	WA1-0380-000 000	B	1	DIODE MA157	
D2302	WA1-0961-000 000	B	1	DIODE MA112	
D2303	WA1-0961-000 000	B	1	DIODE MA112	
D2304	WA1-0961-000 000	B	1	DIODE MA112	
D2601	WA1-0380-000 000	B	1	DIODE MA157	
D2701	WA1-0696-000 201	B	1	DIODE MA152WA	
D2702	WA1-0962-000 000	B	1	DIODE MA121	
D2703	WA1-0962-000 000	B	1	DIODE MA121	
D2704	WA1-0961-000 000	B	1	DIODE MA112	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
D2901	WA1-0989-000 000	B	1	DIODE MA3100W	
D2902	WA1-0961-000 000	B	1	DIODE MA112	
D2903	WA1-1123-000 000	B	1	DIODE AG01Z	
D2904	WA1-1124-000 000	B	1	DIODE SHV02	
D2905	WA1-0961-000 000	B	1	DIODE MA112	
D2906	WA1-0564-000 000	B	1	ZENER DIODE RD9.1M-T1B	
D2951	WA1-0961-000 000	B	1	DIODE MA112	
FT2931	WE2-0414-000 000	C	1	FILTER, NOISE	
IC101	DH4-0190-000 000	B	1	IC CXA1237AR	
IC102	WA4-0509-000 201	B	1	IC NJM2043M	
IC103	DH4-0192-000 000	B	1	IC CXA1202R	
IC104	DH4-0196-000 000	B	1	IC CXA1203N	
IC105	DH4-0180-001 000	B	1	IC CXA1200BQ	
IC106	DH4-0139-000 000	B	1	IC CXL1502M	
IC107	DH4-0205-000 000	B	1	IC LVC556F-2	
IC411	DH4-0189-000 000	B	1	IC CXA1127M	
IC412	DH4-0030-000 000	B	1	IC CX20115	
IC431	DH4-0029-000 000	B	1	IC CX20114	
IC441	DH4-0135-000 000	B	1	IC CXA1204Q	
IC601	DH4-0204-000 000	B	1	IC CXP80116	
IC602	DH4-0181-000 000	B	1	IC UPC7508G	
IC603	WA4-0905-000 000	B	1	IC TA7733F-T1	
IC604	WA4-0681-000 201	B	1	IC M5236ML	
IC605	WA4-1167-000 000	B	1	IC RH5RA50A	
IC606	WA4-1145-000 000	B	1	IC RH5VA45AA (3)	
IC607	WA4-0311-000 000	B	1	IC NJM2903M	
IC608	WA4-0349-000 201	B	1	IC NJM2904M	
IC2001	DH4-0124-000 000	B	1	IC MN53015CXZ	
IC2002	DH4-0125-000 000	B	1	IC MN53015CXY	
IC2051	WA3-3900-000 000	B	1	IC UPD6147G	
IC2102	WA4-0901-000 000	B	1	IC AN2011S	
IC2151	WA3-3679-000 000	B	1	IC MN3828S	
IC2201	WA4-1075-000 000	B	1	IC AN2153NS	
IC2202	WA4-0458-000 000	B	1	IC NJM3414M	
IC2203	WA4-0349-000 201	B	1	IC NJM2904M	
IC2301	WA4-1076-000 000	B	1	IC AN2253FA	
IC2601	WA3-3159-000 000	B	1	IC BU4053BMF	
IC2602	DH4-0134-000 000	B	1	IC UPD6107G	
IC2603	WA4-0363-000 000	B	1	IC NJM4556MB	
IC2604	WA3-3572-000 000	B	1	IC TC4S81F	
IC2605	WA4-0264-000 000	B	1	IC NJM2902M	
IC2606	WA4-0264-000 000	B	1	IC NJM2902M	
IC2607	WA4-0264-000 000	B	1	IC NJM2902M	
IC2608	WA4-0349-000 201	B	1	IC NJM2904M	
IC2701	DH4-0184-000 000	B	1	IC UPD7564G	
IC2702	WA4-1145-000 000	B	1	IC R5VA45AA (3)	
IC2901	WA4-0511-000 000	B	1	IC AN2510S	
IC2932	DH4-0205-000 000	B	1	IC LVC556F-2	
IC2941	DH4-0155-000 000	B	1	IC UPD6145G-101-T1	
L2902	DH9-0392-000 000	C	1	COIL 240μH	
Q101	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q102	WA2-0759-000 000	B	1	TRANSISTOR DIA144EK	
Q103	WA2-0646-000 000	B	1	TRANSISTOR 2SD1328	
Q104	WA2-0646-000 000	B	1	TRANSISTOR 2SD1328	
Q105	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q106	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q107	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q108	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162	
Q109	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q110	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	

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ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
Q111	WA2-1452-000 000	B	1	TRANSISTOR 2SB1073 (Q,R)	
Q112	WA2-1452-000 000	B	1	TRANSISTOR 2SB1073 (Q,R)	
Q115	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q116	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q117	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q118	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q119	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q120	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q121	WA2-1133-000 000	B	1	TRANSISTOR IMX3-T108	
Q122	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q123	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q124	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q125	WA2-1133-000 000	B	1	TRANSISTOR IMX3-T108	
Q126	WA2-1229-000 000	B	1	TRANSISTOR IMH4-T110	
Q127	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q128	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q129	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q130	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q131	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,LB)	
Q132	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q133	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q134	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q135	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q136	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q137	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q138	WA2-1230-000 000	B	1	TRANSISTOR IMH6-T108	
Q139	WA2-1230-000 000	B	1	TRANSISTOR IMH6-T108	
Q140	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q141	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q142	WA2-1230-000 000	B	1	TRANSISTOR IMH6-T108	
Q143	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q144	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q145	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q146	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q147	WA2-1298-000 000	B	1	TRANSISTOR DTC124TK	
Q148	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q149	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q152	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q153	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q401	WA2-1368-000 000	B	1	TRANSISTOR DTC114EK	
Q402	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213 (Y)	
Q403	WA2-1368-000 000	B	1	TRANSISTOR DTC114EK	
Q404	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213 (Y)	
Q411	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q431	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q432	WA2-1198-000 000	B	1	TRANSISTOR IMD2-T108	
Q601	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q602	WA2-0760-000 000	B	1	TRANSISTOR DTC114TK	
Q603	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q605	WA2-1121-000 000	B	1	TRANSISTOR DTC143EK	
Q606	WA2-1099-000 000	B	1	TRANSISTOR FMW1-T98	
Q607	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q609	WA2-1099-000 000	B	1	TRANSISTOR FMW1-T98	
Q610	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q611	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213 (Y)	
Q612	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q613	WA2-1202-000 000	B	1	TRANSISTOR 2SB1121	
Q614	WA2-1202-000 000	B	1	TRANSISTOR 2SB1121	
Q615	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q616	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
Q617	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q619	WA2-1248-000 000	B	1	TRANSISTOR DTA124EK	
Q620	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q621	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q622	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q623	WA2-1121-000 000	B	1	TRANSISTOR DTC143EK	
Q624	WA2-0760-000 000	B	1	TRANSISTOR DTC114TK	
Q625	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2001	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q2002	WA2-1027-000 000	B	1	FET 2SK198	
Q2051	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q2052	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
Q2053	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
Q2054	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
Q2055	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
Q2056	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
Q2057	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
Q2101	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2102	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2103	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2151	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q2201	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2202	WA2-1256-000 000	B	1	TRANSISTOR IMH5-T108	
Q2203	WA2-1256-000 000	B	1	TRANSISTOR IMH5-T108	
Q2204	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2205	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q2206	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2207	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2208	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q2209	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q2210	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q2211	WA2-1256-000 000	B	1	TRANSISTOR IMH5-T108	
Q2212	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q2213	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2214	WA2-1228-000 000	B	1	TRANSISTOR IMT2-T108	
Q2215	WA2-1256-000 000	B	1	TRANSISTOR IMH5-T108	
Q2216	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q2217	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q2301	WA2-1198-000 000	B	1	TRANSISTOR IMD2-T108	
Q2302	WA2-1232-000 000	B	1	TRANSISTOR IMZ1-T108	
Q2304	WA2-1228-000 000	B	1	TRANSISTOR IMT2-T108	
Q2305	WA2-1198-000 000	B	1	TRANSISTOR IMD2-T108	
Q2306	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q2307	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2308	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q2309	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2310	WA2-1228-000 000	B	1	TRANSISTOR IMT2-T108	
Q2311	WA2-1256-000 000	B	1	TRANSISTOR IMH5-T108	
Q2312	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q2313	WA2-1234-000 000	B	1	TRANSISTOR IMX2-T108	
Q2314	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2601	WA2-1241-000 000	B	1	FET 2SK620	
Q2602	WA2-1256-000 000	B	1	TRANSISTOR IMH5-T108	
Q2603	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2701	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2702	WA2-1198-000 000	B	1	TRANSISTOR IMD2-T108	
Q2703	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2901	WA2-0839-000 000	B	1	TRANSISTOR 2SA1226	
Q2902	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q2903	WA2-0481-000 000	B	1	TRANSISTOR 2SD968A	

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ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
Q2904	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q2934	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213 (Y)	
Q2951	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q2952	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q2953	WA2-1133-000 000	B	1	TRANSISTOR IMX3-T108	
Q2954	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
⚠ RR101	DH4-0142-000 000	D	1	LINK, IC	
⚠ RR601	DH4-0144-000 000	D	1	LINK, IC ICP-F25	
⚠ RR2931	DH4-0141-000 000	D	1	LINK, IC	
⚠ RR2932	DH4-0141-000 000	D	1	LINK, IC	
⚠ RR2933	DH4-0141-000 000	D	1	LINK, IC	
⚠ RR2934	DH4-0166-000 000	D	1	LINK, IC	
SW2701	WC2-0190-000 000	C	1	SWITCH, PUSH	
SW2702	WC2-0190-000 000	C	1	SWITCH, PUSH	
SW2703	WC2-0190-000 000	C	1	SWITCH, PUSH	
SW2704	WC2-0190-000 000	C	1	SWITCH, PUSH	
SW2705	WC2-0190-000 000	C	1	SWITCH, PUSH	
SW2706	WC2-0190-000 000	C	1	SWITCH, PUSH	
SW2707	WC2-0190-000 000	C	1	SWITCH, PUSH	
SW2971	WC2-0172-000 000	C	1	SWITCH, PUSH	
T2901	DH9-0391-000 000	C	1	TRANSFORMER, FLYBACK	
TC601	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
TH2901	WA8-0186-000 000	C	1	THERMISTER	
VC2001	VC6-3670-100 000	C	1	CAPACITOR, VARIABLE	
VC2002	VC6-3670-100 000	C	1	CAPACITOR, VARIABLE	
VC2301	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
VC2941	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
VL101	DH6-0234-000 000	C	1	FILTER, LC (4.43MHz)	
VL102	DH6-0205-000 000	C	1	FILTER, LC (5.9MHz)	
VR101	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR102	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR103	VR5-7780-332 000	C	1	RESISTOR, VARIABLE 3.3KΩ	
VR104	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR105	VR5-7780-471 000	C	1	RESISTOR, VARIABLE 470Ω	
VR106	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR107	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR108	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR109	VR5-7780-471 000	C	1	RESISTOR, VARIABLE 470Ω	
VR110	VR5-7780-332 000	C	1	RESISTOR, VARIABLE 3.3KΩ	
VR111	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR112	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR401	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR601	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR602	VR5-7780-473 000	C	1	RESISTOR, VARIABLE 47KΩ	
VR603	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR2101	VR5-5320-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2201	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2202	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2203	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2204	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR2205	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2206	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2207	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR2209	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2301	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2302	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2303	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2304	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2305	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2306	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
VR2601	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2602	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2603	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2604	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2901	VR5-7680-502 000	C	1	RESISTOR, VARIABLE 5KΩ	
VR2902	VR5-7680-201 000	C	1	RESISTOR, VARIABLE 200Ω	
VR2903	VR5-4640-205 000	C	1	RESISTOR, VARIABLE 2MΩ	
VR2904	VR5-4640-504 000	C	1	RESISTOR, VARIABLE 500KΩ	
VR2931	VR5-7680-102 000	C	1	RESISTOR, VARIABLE 1KΩ	
X101	DH9-0346-000 000	C	1	OSCILLATOR, CRYSTAL (4.43MHz)	
X441	WK2-0467-000 000	C	1	OSCILLATOR, CRYSTAL (5.85MHz)	
X601	DH9-0363-000 000	C	1	OSCILLATOR, CRYSTAL (8MHz)	
X602	WK2-0508-000 000	C	1	OSCILLATOR, CRYSTAL (32.768KHz)	
X2001	DH9-0376-000 000	C	1	OSCILLATOR, CRYSTAL (19.3125MHz)	
X2002	DH9-0422-000 000	C	1	OSCILLATOR, CRYSTAL (17.734475MHz)	
X2701	WK2-0518-000 000	C	1	OSCILLATOR, CERA. (700KHz)	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
2	DA1-1557-000 000	B	1	ACCESSORY, SHOE	
2	DA1-1573-000 000	B	1	EYE CUP RUBBER	
2	DA1-1598-000 000	B	1	SPRING, ACCESSORY SHOE	
2	DA1-1702-000 000	B	1	HOOD	
4	DA1-1802-000 000	C	1	HOLDER, CAMERA 2	
4	DA1-1811-000 000	C	2	CUSHION, RUBBER	
4	DA1-1815-000 000	C	2	SCREW	
6	DA1-1822-000 000	C	1	HOLDER, RECORDER (3)	
2	DA1-1834-000 000	B	1	COVER, BATTERY	
2	DA1-1835-000 000	C	1	RING, RUBBER	
2	DA1-1840-000 000	A	2	SEAL	
2	DA1-1848-000 000	B	1	COVER, RF	
2	DA1-1853-000 000	C	2	TERMINAL, BATTERY	
2	DA1-1854-000 000	C	1	MASK, CRT	
2	DA1-1855-000 000	C	1	RUBBER, MASK	
2	DA1-1856-000 000	C	1	HOLDER, MASK	
2	DA1-1857-000 000	C	1	KNOB, BATTERY	
2	DA1-1860-000 000	C	1	TELE WIDE KNOB	
2	DA1-1862-000 000	C	1	PLATE	
2	DA1-1864-000 000	B	1	RING, RUBBER	
2	DA1-1866-000 000	B	1	STRAP, HAND	
6	DA1-1884-000 000	C	1	CASE, SHIELD	
6	DA1-1895-000 000	F	2	SCREW	
6	DA1-1900-000 000	C	1	SCREW	
2	DA1-1931-000 000	C	4	STEEL BALL, SUJ (2)	
2	DA1-1940-000 000	C	1	SEAL, PC	
6	DA1-1945-000 000	C	1	HOLDER, RECORDER (4)	
6	DA1-1948-000 000	C	2	SCREW	
4	DA1-2138-000 000	C	1	SHEET	
2	DA1-2147-000 000	C	2	CUSHION	
4	DA7-1620-000 000	C	1	BAR, ZOOMING	
4	DA7-1717-000 000	C	1	ZOOM CAM	
4	DA7-1724-000 000	C	1	STOPPER, NEARDISTANCE	
4	DA7-1727-000 000	C	1	SPRING, PLATE	
4	DA7-1728-000 000	C	1	SHEET, ZOOM	
4	DA7-1730-000 000	C	1	BLIND, IG METER (A)	
4	DA7-1734-000 000	C	1	STOPPER, RUBBER	
4	DA7-1737-000 000	F	1	SET SCREW	
4	DA7-1738-000 000	C	1	SHIELD, LIGHT SPONGE RUBBER	
4	DA7-1739-000 000	C	1	COVER, IG METER	
2	DF1-0406-060 000	B	1	CAP, LENS	
2	DF1-0431-000 000	C	1	COVER, CASSETTE	E80E ONLY
2	DF1-0432-000 000	C	1	COVER, CASSETTE	E80F ONLY
4	DF1-0436-010 000	C	1	CONTACT, BATTERY	
6	DF1-0442-000 000	C	1	HOLDER, RECORDER (1)	
6	DF1-0443-000 000	C	1	HOLDER, RECORDER (2)	
6	DF1-0444-000 000	C	1	PRINTED CORD P.I. W/CONNECTOR	
	DF1-0446-000 000	C	1	CONNECTOR ASS'Y 6P	
4	DF1-0448-000 000	C	1	HOLDER, CAMERA 1	
2	DF1-0449-000 000	C	1	PLATE, GRIP	
4	DF7-0227-000 000	C	1	BLIND, IG METER (B)	
6	DG1-0477-000 000	C	1	RECORDER KEY (1) C.B.A.	
6	DG1-0478-000 000	C	1	RECORDER KEY (2) C.B.A.	
4	DG1-0484-010 000	C	1	CAMERA KEY C.B.A.	
2	DG1-0485-000 000	C	1	REMOCON C.B.A.	
4	DG1-0486-000 000	C	1	PIN. JACK C.B.A.	
2	DG1-0498-000 000	B	1	FINDER ASS'Y	
4	DG1-0499-000 000	C	1	MIC. JACK C.B.A.	
6	DG1-0525-001 000	C	1	CT C.B.A.	
6	DG1-0529-000 000	C	1	SYSCON SERVO C.B.A.	

PARTS LIST

	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	6	DG1-0530-000 000	C	1	AUDIO VIDEO C.B.A.	
	4	DG1-0533-000 000	C	1	SENSOR C.B.A.	
	4	DG1-0534-000 000	C	1	PROCESS C.B.A.	
	2	DG1-0550-000 000	C	1	GRIP C.B.A.	
	4	DG9-3306-000 000	C	1	RELAY LENS ASS'Y	
	4	DG9-3310-000 000	C	1	AF MOTOR ASS'Y D.C. 10W UNDER	
	4	DG9-3311-000 000	C	1	PZ MOTOR ASS'Y D.C. 10W UNDER	
	4	DG9-3340-000 000	C	1	VARIATOR LENS ASS'Y	
	4	DG9-3341-000 000	C	1	COMPENSATOR LENS ASS'Y	
	4	DG9-3342-000 000	C	1	RELAY HOLDER ASS'Y	
	4	DG9-3372-000 000	C	1	AF MAIN C.B.A.	
	4	DG9-3382-000 000	C	1	ZOOM RING ASS'Y	
		DH2-0944-040 000	C	1	CONNECTOR ASS'Y 6P	
		DH2-0945-050 000	C	1	CONNECTOR ASS'Y 12P	
		DH2-0946-000 000	C	1	CONNECTOR ASS'Y 8P	
		DH2-0947-000 000	C	1	CONNECTOR ASS'Y 6P	
		DH2-0951-000 000	C	1	CONNECTOR ASS'Y 3P	
		DH2-0952-000 000	C	1	CONNECTOR ASS'Y 3P	
		DH2-0957-000 000	C	1	PRINTED CODE P.I.	
		DH2-0962-000 000	C	1	CONNECTOR ASS'Y 2P	
	4	DH3-0011-000 000	C	1	DC/DC CONVERTER	
		DH4-0029-000 000	B	1	IC CX20114	
		DH4-0030-000 000	B	1	IC CX20115	
		DH4-0124-000 000	B	1	IC MN53015CXZ	
		DH4-0125-000 000	B	1	IC MN53015CXY	
		DH4-0134-000 000	B	1	IC UPD6107G	
		DH4-0135-000 000	B	1	IC CXA1204Q	
		DH4-0139-000 000	B	1	IC CXL1502M	
⚠		DH4-0141-000 000	D	3	LINK, IC	
⚠		DH4-0142-000 000	D	1	LINK, IC	
⚠		DH4-0144-000 000	D	1	LINK, IC ICP-F25	
		DH4-0155-000 000	B	1	IC UPD6145G-101-T1	
⚠		DH4-0166-000 000	D	1	LINK, IC	
		DH4-0180-001 000	B	1	IC CXA1200BQ	
		DH4-0181-000 000	B	1	IC UPC7508G	
		DH4-0184-000 000	B	1	IC UPD7564G	
		DH4-0189-000 000	B	1	IC CXA1127M	
		DH4-0190-000 000	B	1	IC CXA1237AR	
		DH4-0192-000 000	B	1	IC CXA1202R	
		DH4-0196-000 000	B	1	IC CXA1203N	
		DH4-0204-000 000	B	1	IC CXP80116	
		DH4-0205-000 000	B	2	IC LVC556F-2	
	4	DH4-0206-000 000	B	1	CCD MN3745FC	
		DH6-0205-000 000	C	1	FILTER, LC (5.9MHz)	
		DH6-0234-000 000	C	1	FILTER, LC (4.43MHz)	
	4	DH8-0043-000 000	C	1	IG METER	
⚠	2	DH9-0323-000 000	D	1	CRT	
		DH9-0346-000 000	C	1	OSCILLATOR, CRYSTAL (4.43MHz)	
		DH9-0363-000 000	C	1	OSCILLATOR, CRYSTAL (8MHz)	
		DH9-0376-000 000	C	1	OSCILLATOR, CRYSTAL (19.3125MHz)	
	2	DH9-0389-000 000	C	1	MICROPHONE	
		DH9-0391-000 000	C	1	TRANSFORMER, FLYBACK	
		DH9-0392-000 000	C	1	COIL 240μH	
	2	DH9-0393-000 000	C	1	DEFRECTION YOKE	
		DH9-0422-000 000	C	1	OSCILLATOR, CRYSTAL (17.734475MHz)	
	4	DS1-5178-000 000	C	1	SPRING, COIL	
	2	DY1-1065-000 000	B	1	RIGHT COVER, GRIP	E80E ONLY
	2	DY1-1066-000 000	B	1	RIGHT COVER, GRIP	E80F ONLY
	4	DY1-7097-000 000	C	1	AF BLOCK ASS'Y	
	4	DY1-7098-000 000	C	1	ZOOM LENS ASS'Y	

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PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
4	DY1-7100-000 000	C	1	FOCUS LENS ASS'Y	
2	DY2-1068-000 000	B	1	FILTER, INFRARED	
2	DY2-1071-000 000	B	1	LEFT COVER, GRIP	
2	DY2-1087-000 000	B	1	TOP COVER ASS'Y	E80E ONLY
2	DY2-1088-000 000	B	1	TOP COVER ASS'Y	E80F ONLY
2	DY2-1089-000 000	B	1	RIGHT COVER ASS'Y	E80E ONLY
2	DY2-1090-000 000	B	1	RIGHT COVER ASS'Y	E80F ONLY
2	DY2-1091-000 000	B	1	REAR COVER ASS'Y	E80E ONLY
2	DY2-1092-000 000	B	1	REAR COVER ASS'Y	E80F ONLY
2	DY2-1101-000 000	B	1	LEFT COVER ASS'Y	
2	DY2-6014-000 000	C	1	WIRELESS CONTROLLER	E80E ONLY
2	DY2-6016-000 000	C	1	WIRELESS CONTROLLER	E80F ONLY
10,12	DY4-2440-000 000	F	3	WASHER	
8	DY4-2452-000 000	F	3	SCREW	
12	DY4-2527-000 000	F	1	WASHER	
12	DY4-2648-000 000	C	1	COASTER, LEFT	
12	DY4-2649-000 000	C	1	COASTER, RIGHT	
12	DY4-2650-000 000	C	1	GEAR ASS'Y	
8	DY4-2651-000 000	C	1	LOADING MOTOR ASS'Y	
8	DY4-2652-000 000	C	1	ROLLER ASS'Y	
10	DY4-2653-000 000	C	1	ARM, PINCH	
12	DY4-2654-000 000	C	1	GEAR ASS'Y	
12	DY4-2655-000 000	C	1	LEVER, THREADING	
12	DY4-2656-000 000	C	1	GEAR, JOINT	
10	DY4-2657-000 000	C	1	LEVER, SWITCH	
12	DY4-2658-000 000	C	1	WORM ASS'Y	
12	DY4-2659-000 000	C	1	BRAKE, TS	
10	DY4-2660-000 000	C	1	BAND, TENSION	
12	DY4-2661-000 000	C	1	GEAR	
12	DY4-2662-000 000	C	1	ROLLER	
10	DY4-2663-000 000	C	1	REEL, SUPPLY	
10	DY4-2664-000 000	C	1	ARM, TG7	
12	DY4-2665-000 000	C	1	ARM, PINCH SUB	
10	DY4-2666-000 000	C	1	REEL, TAKE UP	
12	DY4-2667-000 000	C	1	GEAR	
12	DY4-2668-000 000	C	1	GEAR	
10	DY4-2669-000 000	C	1	ARM	
12	DY4-2670-000 000	C	1	CHASSIS ASS'Y	
12	DY4-2671-000 000	C	1	PULLY, RELAY	
12	DY4-2672-000 000	C	1	PLATE, SS	
8	DY4-2673-000 000	C	1	CASSETTE COMPARTMENT ASS'Y	
12	DY4-2674-000 000	C	1	ROLLER, GUIDE	
8	DY4-2675-000 000	C	1	TERMINAL, EARTH	
10	DY4-2676-000 000	C	1	SWITCH	
10	DY4-2677-000 000	C	1	SWITCH, SLIDE	
10	DY4-2678-000 000	C	1	SWITCH, PUSH	
10	DY4-2679-000 000	C	1	FLEXIBLE C.B.A. (1)	
10	DY4-2680-000 000	C	1	FLEXIBLE C.B.A. (2)	
10,12	DY4-2681-000 000	F	4	WASHER	
12	DY4-2684-000 000	C	1	PLATE, TT	
12	DY4-2685-000 000	C	2	SPRING, LEAF	
12	DY4-2686-000 000	F	2	SCREW	
12	DY4-2687-000 000	C	1	GEAR, WHEEL	
10,12	DY4-2688-000 000	F	6	WASHER	
12	DY4-2689-000 000	F	2	SCREW	
10	DY4-2690-000 000	C	1	PLATE, TL	
10	DY4-2691-000 000	C	1	BRAKE, LB	
10	DY4-2692-000 000	C	1	LEVER, LB	
12	DY4-2693-000 000	C	1	ARM, RELEASE	
12	DY4-2694-000 000	C	1	GEAR, UL	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
12	DY4-2695-000 000	C	1	ARM, UL	
10	DY4-2696-000 000	C	4	PIN, SHAFT	
10	DY4-2697-000 000	C	1	SPRING, COIL	
12	DY4-2698-000 000	C	1	SPRING, COIL	
10	DY4-2699-000 000	C	1	SPRING, COIL	
12	DY4-2700-000 000	C	1	SPRING	
10	DY4-2701-000 000	C	1	FRANGE, TG2	
10	DY4-2702-000 000	C	1	ROLLER, TG2	
10	DY4-2703-000 000	C	1	FRANGE, TG2	
10	DY4-2704-000 000	C	1	SLEEVE, TG2	
10	DY4-2705-000 000	C	1	SPRING, COIL	
12	DY4-2706-000 000	C	1	SPRING, COIL	
10	DY4-2707-000 000	C	1	SPRING, PLATE	
8	DY4-2708-000 000	C	1	SPRING, COIL	
8	DY4-2709-000 000	C	1	GEAR, DUMPER	
10	DY4-2710-000 000	C	1	HOLDER, LED	
12	DY4-2711-000 000	C	1	LEVER, EJECT	
10	DY4-2712-000 000	C	1	ARM RELEASE	
10	DY4-2713-000 000	C	1	BRAKE, S	
10	DY4-2714-000 000	C	1	BRAKE, T	
12	DY4-2715-000 000	C	1	BRAKE, UL	
10	DY4-2716-000 000	C	1	ARM, STOPPER	
10	DY4-2717-000 000	C	1	ARM, ADJUST	
12	DY4-2718-000 000	E	1	BELT (L), TIMING	
12	DY4-2719-000 000	E	1	BELT (S), TIMING	
8	DY4-2720-000 000	C	1	DAMPER, OIL	
8	DY4-2721-000 000	C	1	GUARD, GUIDE	
10	DY4-2722-000 000	C	2	HOLDER, SENSOR	
10	DY4-2723-000 000	C	1	STOPPER, RK	
10	DY4-2724-000 000	C	1	SPRING, COIL	
10	DY4-2725-000 000	C	1	PLATE, SWITCH	
8	DY4-2726-000 000	C	1	CAPSTAN MOTOR	
8,10	DY4-2727-000 000	F	11	SCREW	
8,10,12	DY4-2728-000 000	F	7	SCREW	
8	DY4-2729-000 000	C	2	TAPE	
8	DY4-2730-000 000	F	5	SCREW	
8	DY4-2732-000 000	E	1	DRUM ASS'Y	
8	DY4-2733-000 000	E	1	UPPER DRUM ASS'Y	
	VC5-0070-225 000	C	5	CAPACITOR, TANTA. 2.2μF 6.3V	
	VC5-0070-226 000	C	1	CAPACITOR, TANTA. 22μF 6.3V	
	VC5-0070-335 000	C	2	CAPACITOR, TANTA. 3.3μF 6.3V	
	VC5-0090-104 000	C	1	CAPACITOR, TANTA. 0.1μF 35V	
	VC5-0090-473 000	C	1	CAPACITOR, TANTA. 0.047μF 35V	
	VC5-0700-105 000	C	11	CAPACITOR, TANTA. 1μF 10V	
	VC5-0700-106 000	C	1	CAPACITOR, TANTA. 10μF 10V	
	VC5-0700-225 000	C	2	CAPACITOR, TANTA. 2.2μF 6.3V	
	VC5-0700-226 000	C	1	CAPACITOR, TANTA. 22μF 10V	
	VC5-5030-474 000	C	5	CAPACITOR, TANTA. 0.47μF 20V	
	VC5-5050-106 000	C	9	CAPACITOR, TANTA. 10μF 16V	
	VC5-5050-226 000	C	1	CAPACITOR, TANTA. 22μF 16V	
	VC5-5050-475 000	C	1	CAPACITOR, TANTA. 4.7μF 16V	
	VC5-8150-684 202	C	1	CAPACITOR, TANTA. 0.68μF 16V	
	VC5-8160-224 000	C	1	CAPACITOR, TANTA. 0.22μF 35V	
	VC5-9520-102 000	C	1	CAPACITOR, CERA. 1000pF 1KV	
	VC5-9850-472 000	C	1	CAPACITOR, FILM 4700pF 100V	
	VC5-9860-334 000	C	1	CAPACITOR, TANTA. 0.33μF 25V	
	VC6-0340-300 000	C	3	CAPACITOR, TRIMMER 30pF	
	VC6-1570-152 000	C	1	CAPACITOR, CERA. 1500pF 500V	
	VC6-3670-100 000	C	2	CAPACITOR, VARIABLE	
	VC6-4300-226 000	C	3	CAPACITOR, TANTA. 22μF 16V	

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PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	VC6-4310-336 000	C	2	CAPACITOR, TANTA. 33μF 10V	
	VC9-9046-000 000	C	1	CAPACITOR, TANTA. 0.68μF 20V	
	VR5-4640-205 000	C	1	RESISTOR, VARIABLE 2MΩ	
	VR5-4640-504 000	C	1	RESISTOR, VARIABLE 500KΩ	
	VR5-5320-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
	VR5-7680-102 000	C	1	RESISTOR, VARIABLE 1KΩ	
	VR5-7680-201 000	C	1	RESISTOR, VARIABLE 200Ω	
	VR5-7680-502 000	C	1	RESISTOR, VARIABLE 5KΩ	
	VR5-7780-103 000	C	12	RESISTOR, VARIABLE 10KΩ	
	VR5-7780-222 000	C	5	RESISTOR, VARIABLE 2.2KΩ	
	VR5-7780-223 000	C	4	RESISTOR, VARIABLE 22KΩ	
	VR5-7780-332 000	C	2	RESISTOR, VARIABLE 3.3KΩ	
	VR5-7780-471 000	C	2	RESISTOR, VARIABLE 470Ω	
	VR5-7780-472 000	C	8	RESISTOR, VARIABLE 4.7KΩ	
	VR5-7780-473 000	C	1	RESISTOR, VARIABLE 47KΩ	
	VS1-0850-009 000	C	1	CONNECTOR 9P	
	VS1-0850-016 000	C	1	CONNECTOR 16P	
	VS1-0851-009 000	C	1	CONNECTOR 9P	
	VS1-0851-016 000	C	1	CONNECTOR 16P	
	WA1-0380-000 000	B	7	DIODE MA157	
	WA1-0384-000 000	B	1	ZENER DIODE RD5.6MB2	
	WA1-0547-000 201	B	6	DIODE 1SS184	
	WA1-0564-000 000	B	1	ZENER DIODE RD9.1M-T1B	
	WA1-0612-000 201	B	2	DIODE E10QS03	
	WA1-0696-000 201	B	1	DIODE MA152WA	
	WA1-0961-000 000	B	30	DIODE MA112	
	WA1-0962-000 000	B	4	DIODE MA121	
	WA1-0985-000 000	B	1	DIODE MA341	
	WA1-0989-000 000	B	1	DIODE MA3100W	
	WA1-1123-000 000	B	1	DIODE AG01Z	
	WA1-1124-000 000	B	1	DIODE SHV02	
	WA1-1146-000 000	B	2	DIODE MA707	
	WA2-0052-000 000	B	3	TRANSISTOR 2SC1621	
	WA2-0393-000 201	B	15	TRANSISTOR 2SA1162 (GR,BL)	
	WA2-0481-000 000	B	1	TRANSISTOR 2SD968A	
	WA2-0646-000 000	B	2	TRANSISTOR 2SD1328	
	WA2-0735-000 201	B	28	TRANSISTOR 2SC2712 (GR,BL)	
	WA2-0759-000 000	B	7	TRANSISTOR DTA144EK	
	WA2-0760-000 000	B	2	TRANSISTOR DTC114TK	
	WA2-0797-000 201	B	4	TRANSISTOR 2SA1213 (Y)	
	WA2-0839-000 000	B	1	TRANSISTOR 2SA1226	
	WA2-0884-000 000	B	11	TRANSISTOR DTC144EK	
	WA2-1027-000 000	B	1	FET 2SK198	
	WA2-1099-000 000	B	2	TRANSISTOR FMW1-T98	
	WA2-1121-000 000	B	2	TRANSISTOR DTC143EK	
	WA2-1133-000 000	B	3	TRANSISTOR IMX3-T108	
	WA2-1172-000 000	B	3	TRANSISTOR 2SA1461	
	WA2-1198-000 000	B	4	TRANSISTOR IMD2-T108	
	WA2-1202-000 000	B	2	TRANSISTOR 2SB1121	
	WA2-1228-000 000	B	3	TRANSISTOR IMT2-T108	
	WA2-1229-000 000	B	1	TRANSISTOR IMH4-T110	
	WA2-1230-000 000	B	3	TRANSISTOR IMH6-T108	
	WA2-1232-000 000	B	10	TRANSISTOR IMZ1-T108	
	WA2-1234-000 000	B	9	TRANSISTOR IMX2-T108	
	WA2-1237-000 000	B	5	TRANSISTOR DTA114TK	
	WA2-1241-000 000	B	1	FET 2SK620	
	WA2-1248-000 000	B	1	TRANSISTOR DTA124EK	
	WA2-1256-000 000	B	6	TRANSISTOR IMH5-T108	
	WA2-1298-000 000	B	1	TRANSISTOR DTC124TK	
	WA2-1368-000 000	B	2	TRANSISTOR DTC114EK	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	WA2-1452-000 000	B	2	TRANSISTOR 2SB1073 (Q,R)	
	WA3-3159-000 000	B	1	IC BU4053BMF	
	WA3-3572-000 000	B	1	IC TC4S81F	
	WA3-3679-000 000	B	1	IC MN3828S	
	WA3-3900-000 000	B	1	IC UPD6147G	
	WA4-0264-000 000	B	3	IC NJM2902M	
	WA4-0311-000 000	B	1	IC NJM2903M	
	WA4-0349-000 201	B	3	IC NJM2904M	
	WA4-0363-000 000	B	1	IC NJM4556MB	
	WA4-0458-000 000	B	1	IC NJM3414M	
	WA4-0509-000 201	B	1	IC NJM2043M	
	WA4-0511-000 000	B	1	IC AN2510S	
	WA4-0681-000 201	B	1	IC M5236ML	
	WA4-0901-000 000	B	1	IC AN2011S	
	WA4-0905-000 000	B	1	IC TA7733F-T1	
	WA4-1075-000 000	B	1	IC AN2153NS	
	WA4-1076-000 000	B	1	IC NA2253FA	
	WA4-1145-000 000	B	2	IC RH5VA45AA (3)	
	WA4-1167-000 000	B	1	IC RH5RA50A	
	WA8-0186-000 000	C	1	THERMISTER	
	WC2-0172-000 000	C	1	SWITCH, PUSH	
	WC2-0190-000 000	C	7	SWITCH, PUSH	
	WE2-0414-000 000	C	1	FILTER, NOISE	
	WK2-0467-000 000	C	1	OSCILLATOR, CRYSTAL (5.85MHz)	
	WK2-0508-000 000	C	1	OSCILLATOR, CRYSTAL (32.768KHz)	
	WK2-0518-000 000	C	1	OSCILLATOR, CERA. (700KHz)	
2,4,6	XA1-7200-357 000	F	12	SCREW, CROSS-RECESS, PH	
2	XA1-7200-359 000	F	3	SCREW, CROSS-RECESS, PH	
2	XA1-7200-459 000	F	13	SCREW, CROSS-RECESS, PH	
2	XA1-7260-709 000	F	4	SCREW, CROSS-RECESS, PH	
4	XA4-2170-707 000	F	2	SCREW, CROSS-RECESS, TAPPING	
4	XA4-4170-407 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-4170-409 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-4170-507 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-4200-507 000	F	1	SCREW, CROSS-RECESS, PH	
2	XA4-7200-459 000	F	3	SCREW, CROSS-RECESS, PH	
4	XA4-9170-557 000	F	3	SCREW, CROSS-RECESS, PH	
4	XA4-9200-209 000	F	2	SCREW	
4	XA4-9200-609 000	F	9	SCREW, CROSS-RECESS, PH	
2	XA9-0435-010 000	F	2	SCREW, CROSS-RECESS,TAPPING	
2	XB1-1300-809 000	F	2	SCREW	
4	XB4-6260-607 000	F	1	SCREW M2.6x6	
4	X96-1723-610 000	F	2	SCREW, SLOTTED, SHOULDER	
2	Y22-2311-000 000	B	1	COVER WIRELESS CONTROLLER	
8	Y22-8012-000 000	B	1	LED GL452S	
8	Y22-8120-000 000	B	1	SENSOR, DEW	
10	Y22-8121-000 000	B	2	SENSOR, PHOTO TLP907-0	
10	Y22-8123-000 000	B	2	PHOTO TRANSISTOR EE-P109	

CONTENTS

CHAPTER Ⅳ. DIAGRAMS

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3-2 PROCESS CAMERA-KERY C.B.A. ..... Ⅳ－7,8
3-3 SYSCON-SERVO C.B.A. ..... Ⅳ－9,10
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3-5 GRIP C.B.A. ..... Ⅳ－13,14

<Guide to diagrams>

1. Color coding

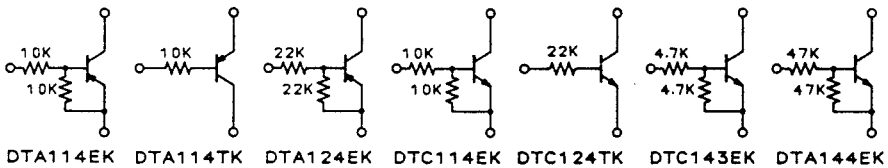
(1) Voltage on circuit diagram
RED : Recording
BLACK : Playback

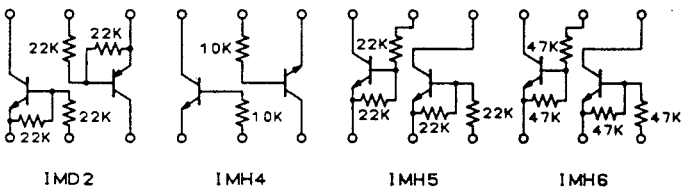
(2) Signal lines on circuit diagram
BLUE : Luminance
ORANGE : Chrominance
HATCHED BLACK : Luminance + Chrominance
RED : Power supply line

(3) PC board layout
ORANGE : Pattern on component side
HATCHED BLACK : Pattern on soldered side
BLACK : Parts mounted on component side
BLUE : Parts mounted on soldered side

(4) Remarks.
Sensor C.B.A. consists of four layers.
The patterns of GND and power supply (+5V), which are omitted from this diagram, are installed between the printed and component sides.
⊘ : Denotes that it is conencted to +5V pattern.
⊗ : Denotes that it is connected to GND.

2. Equivalent circuits of digital transistors are shown below. (Transistors on E/D are circled with broken lines.)





3. Indications on circuit diagram

1) Resistance is represented in ohms (Ω).

2) Capacitance is represented in farads (F).

3) Wattage of resistor is 1/16 W unless otherwise specified.

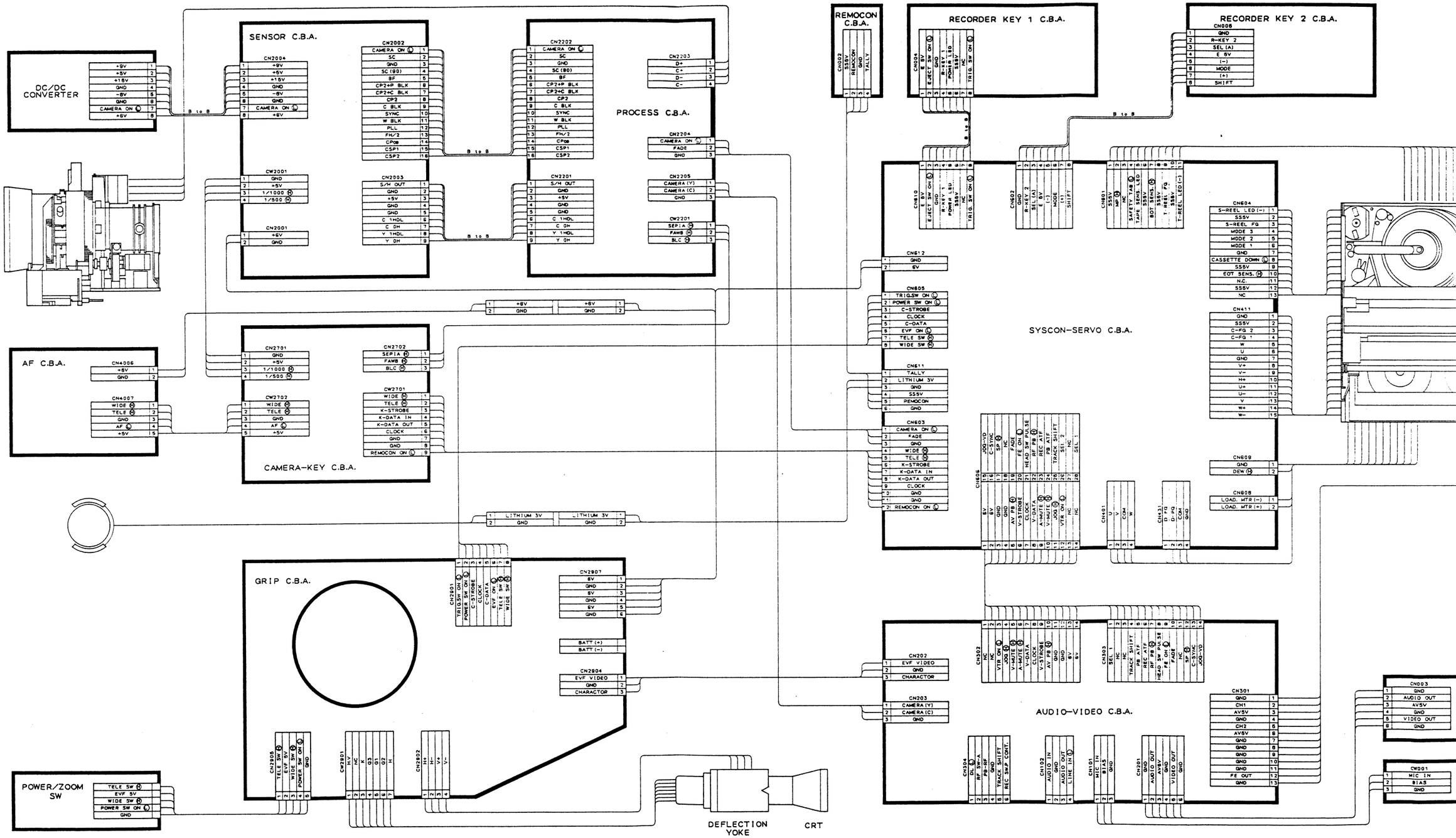
4) Voltages (digital voltmeter used) and waveforms (10:1 probe used) indicated on circuit diagram are measured under the following conditions.

<Camera section>
° Colorbar standard view angle, AWB preset state

<Recorder section>
° Recording : Colorbar (pattern generator)
° Playback : Self-recording → Playback (colorbar)

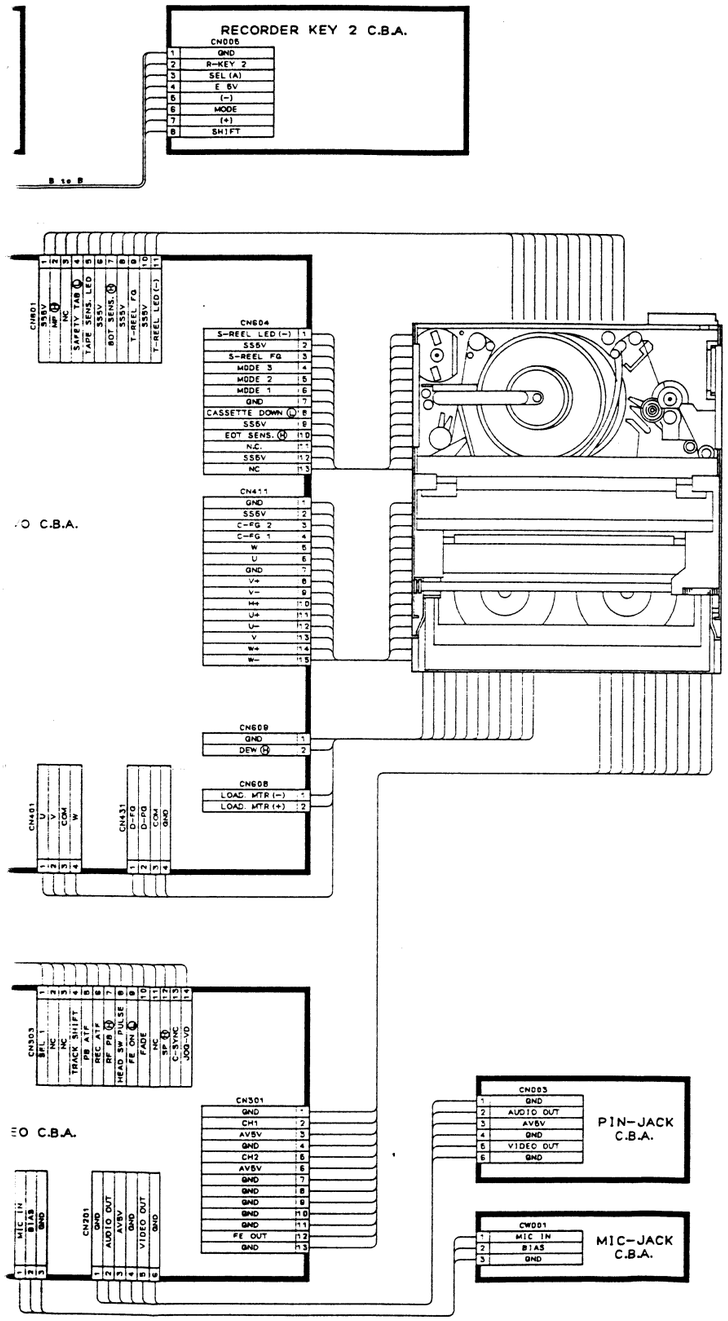
<Grip section>
° Colorbar (pattern generator)

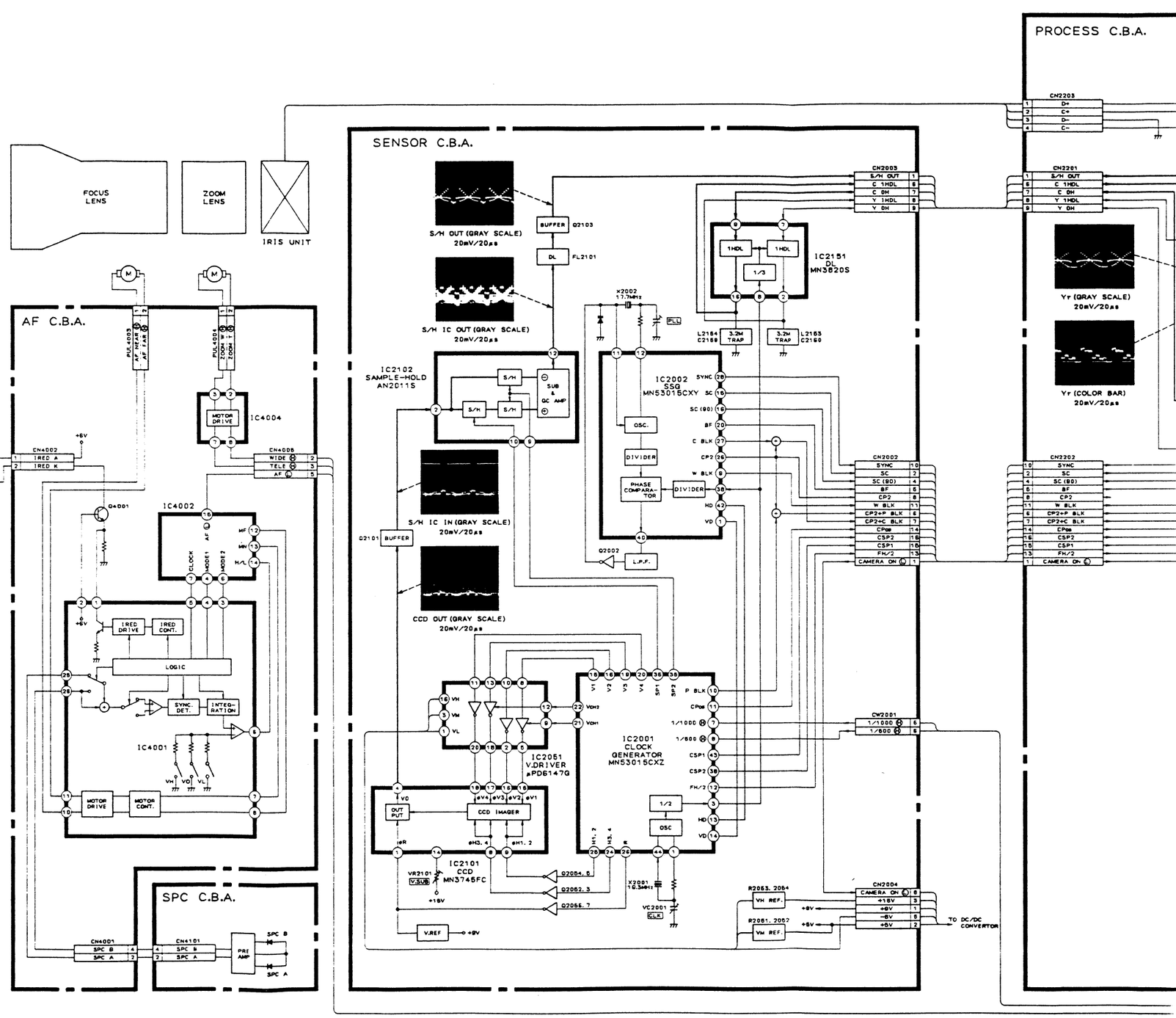
INTERCONNECTION DIAGRAM



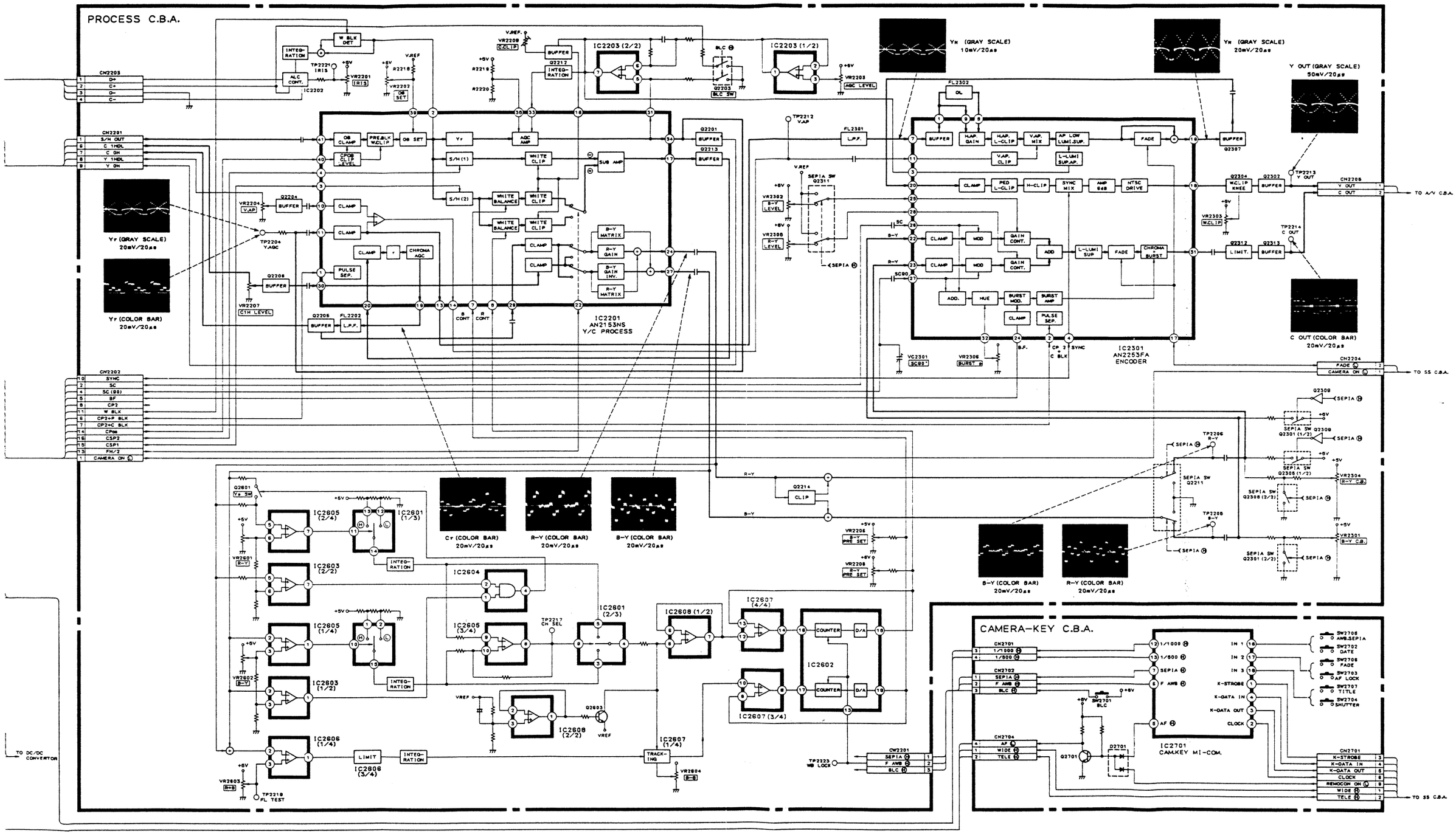
01 Feb. 1989

BLOCK DIAGRAM
CAMERA SECTION

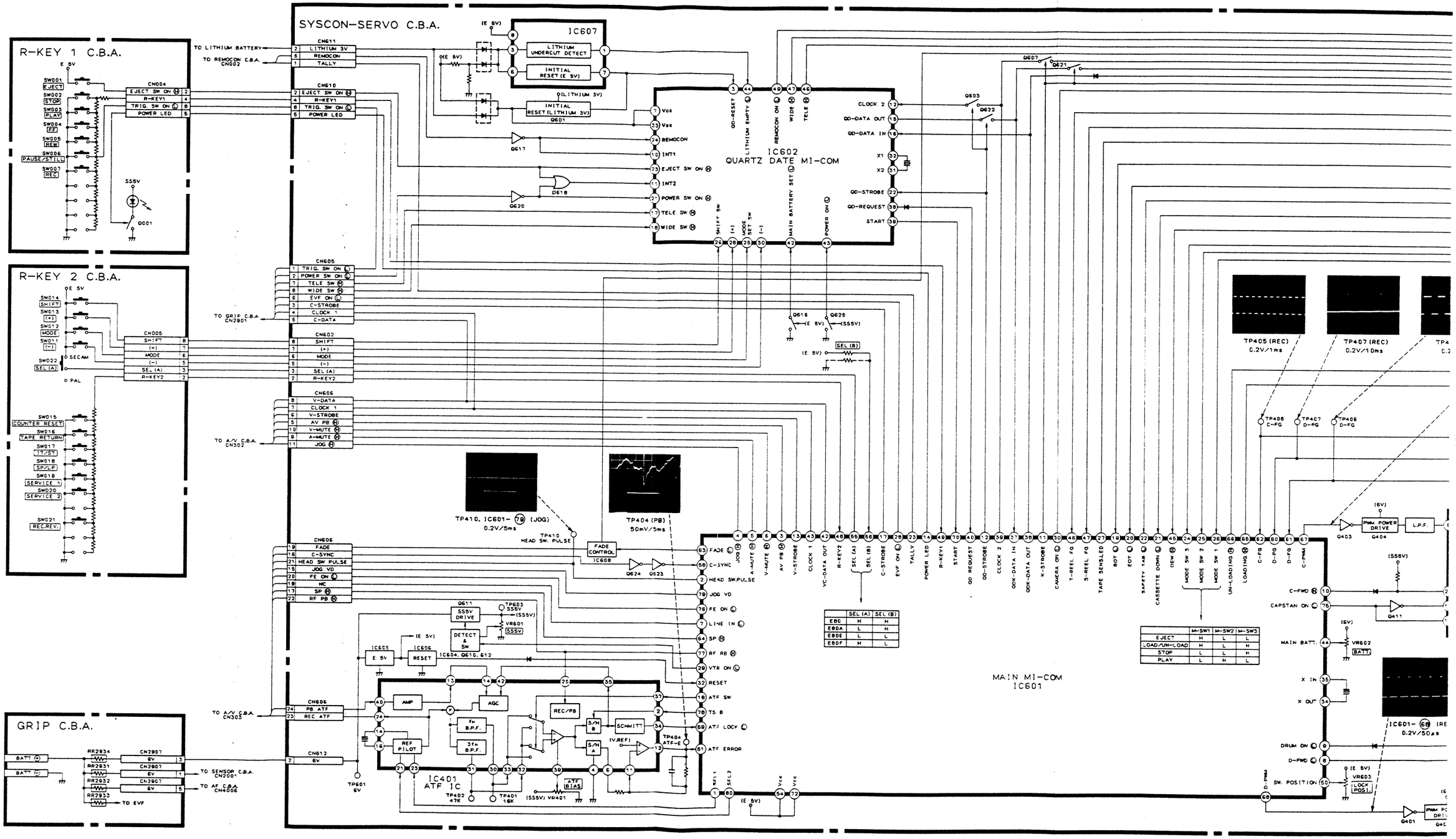


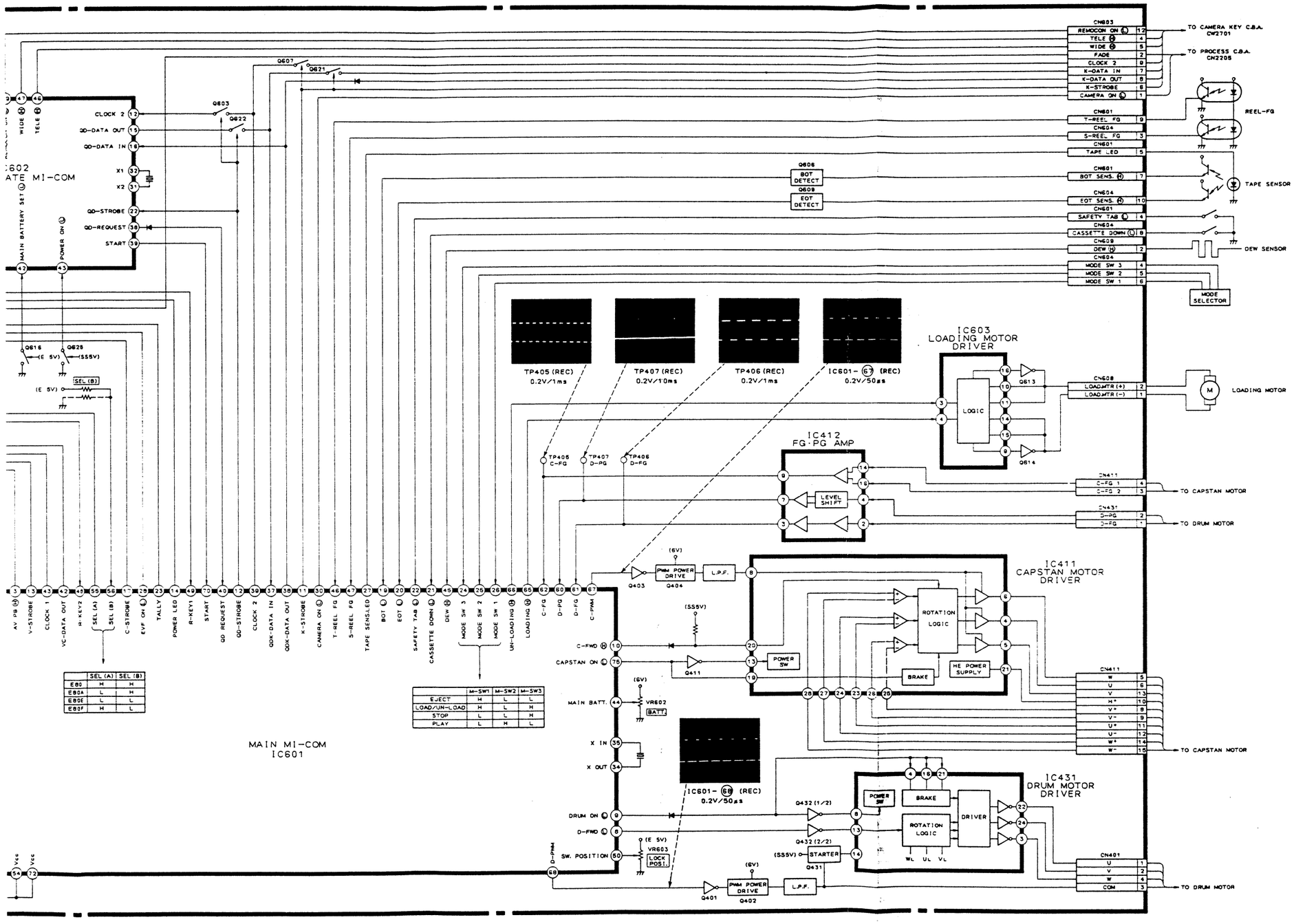


01 Feb. 1989

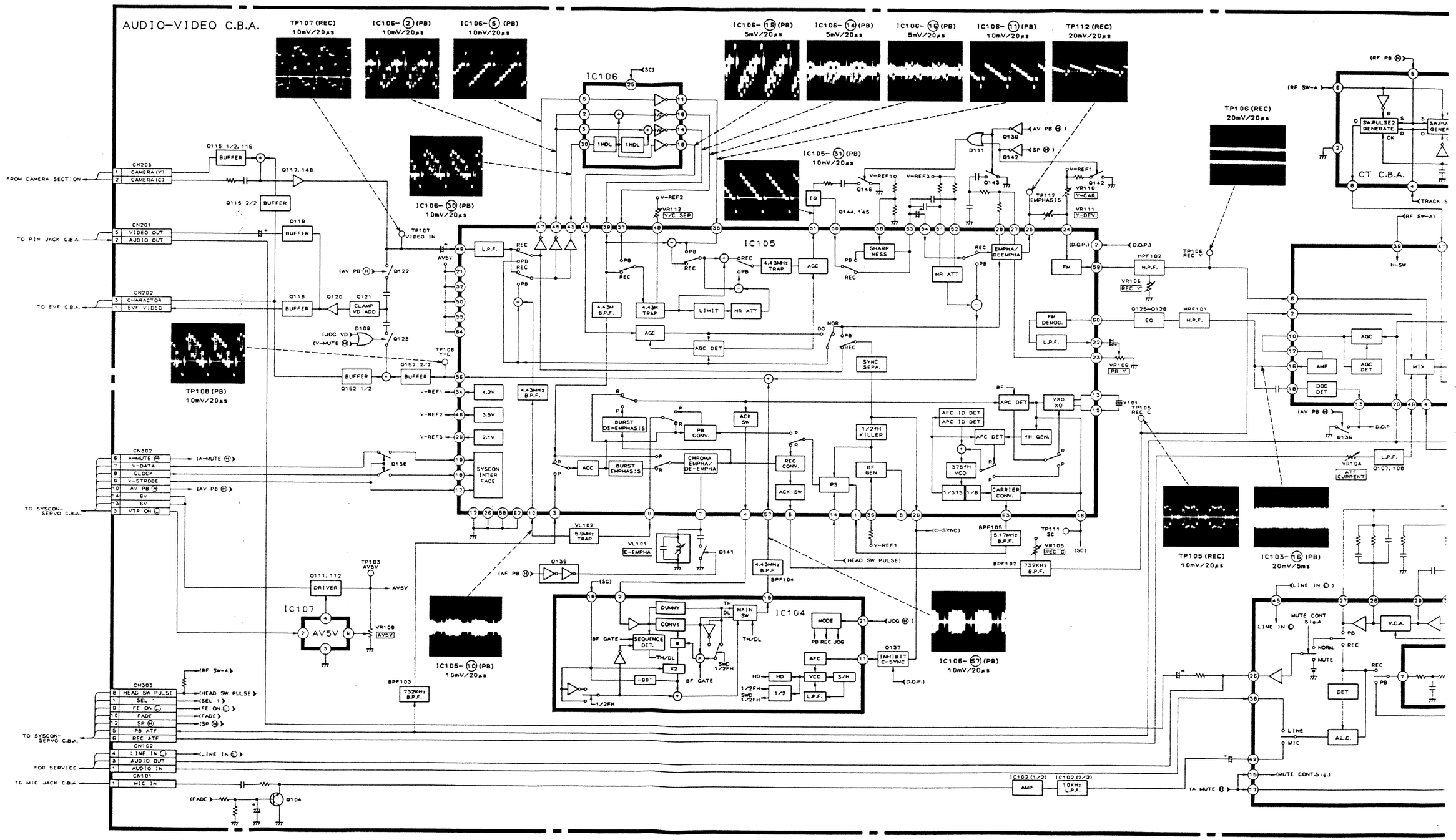


BLOCK DIAGRAM
SYSCON-SERVO SECTION

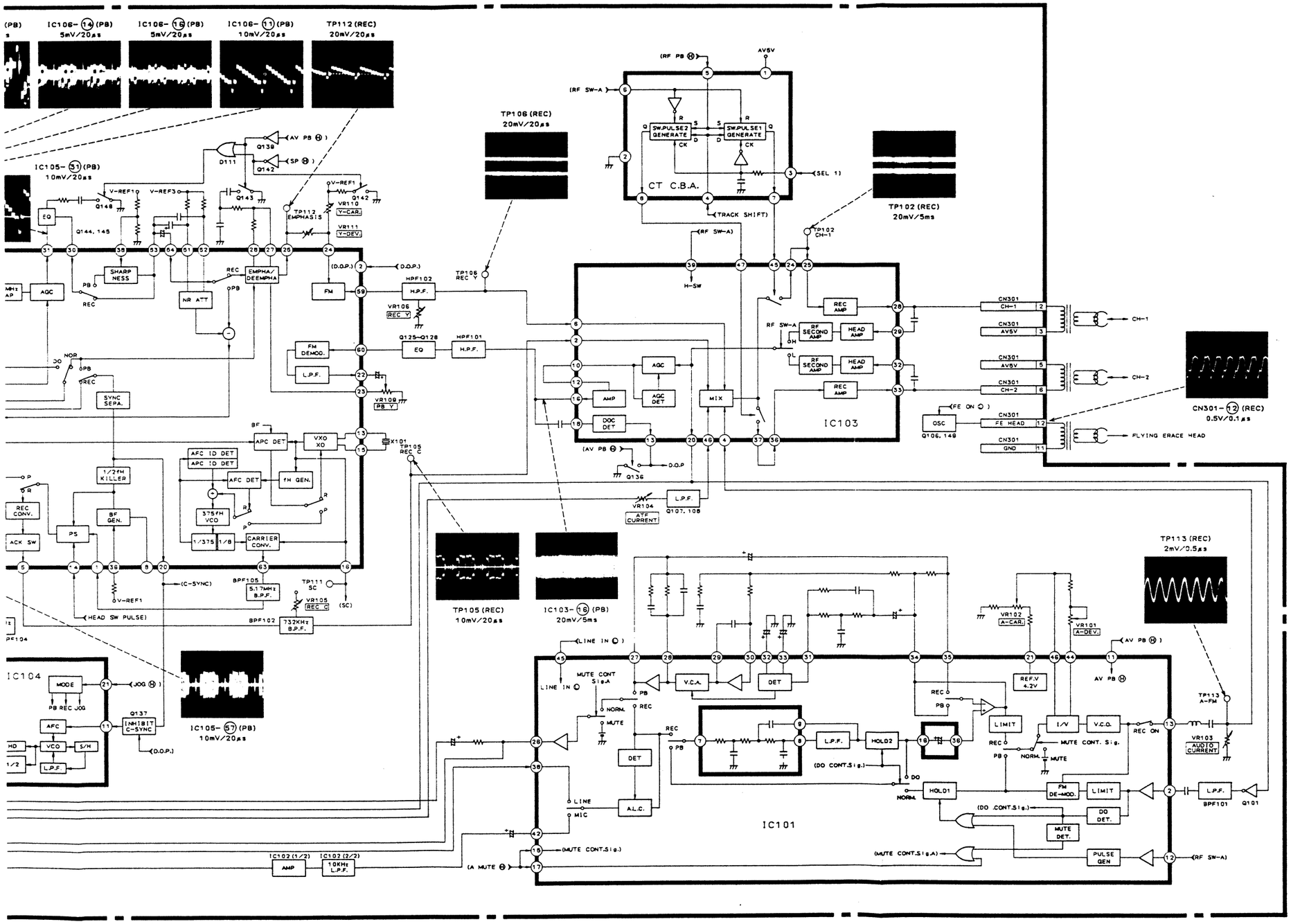




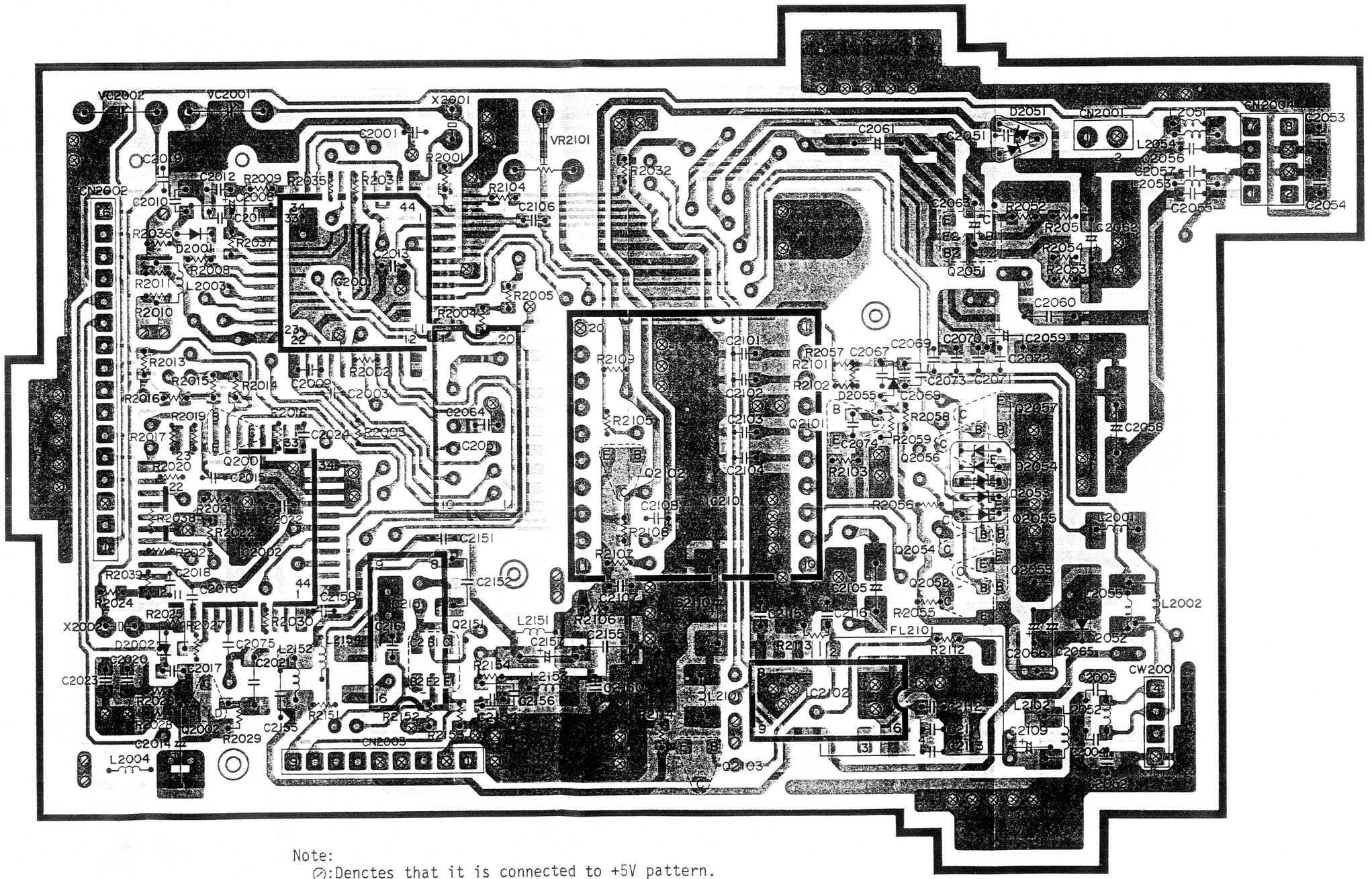
BLOCK DIAGRAM
AUDIO-VIDEO SECTION



01 Feb. 1989



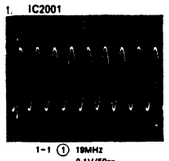
CIRCUIT BOARD DIAGRAM
SENSOR C.B.A.



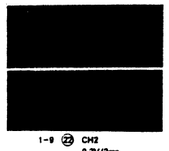
Note:
⊘:Denctes that it is connected to +5V pattern.
⊗:Denctes that it is connected to GND.
(See "Guide to Diagrams" on the front page of this section.)

SIGNAL WAVE

1. IC2001

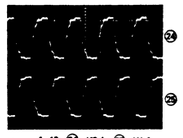


1-1 ① 19MHz
0.1V/50ns

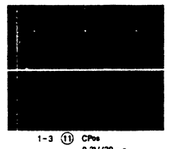


1-9 ㉒ CH2
0.2V/2ms

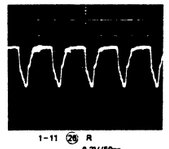
1-2 ⑩ P BLK
0.2V/20 μ s



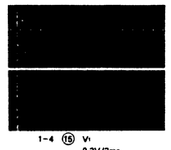
1-10 ㉔ H3.4 ㉕ H1.2
0.2V/50ns



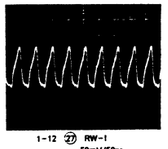
1-3 ⑪ CPos
0.2V/20 μ s



1-11 ㉖ R
0.2V/50ns



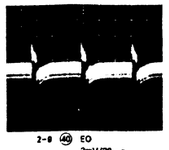
1-4 ⑯ Vt
0.2V/2ms



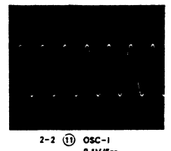
1-12 ㉗ RW-I
50mV/50ns

2. IC2002

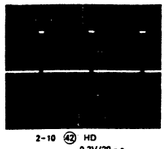
2-1 ⑧ W BLK
0.2V/20 μ s



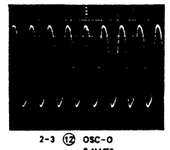
2-9 ㊵ EO
2mV/20 μ s



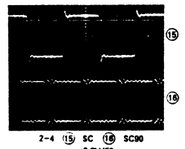
2-2 ⑪ OSC-I
0.1V/5ms



2-10 ㊷ HD
0.2V/20 μ s

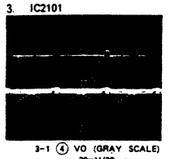


2-3 ⑫ OSC-O
0.1V/50ns

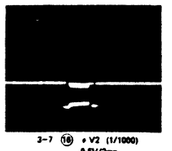


2-4 ⑮ SC ⑯ SC90
0.2V/50ns

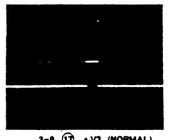
3. IC2101



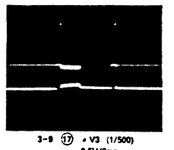
3-1 ④ VO (GRAY SCALE)
20mV/20 μ s



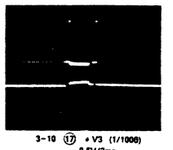
3-7 ⑱ φ V2 (1/1000)
0.5V/2ms



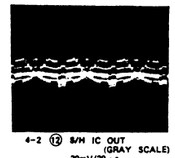
3-8 ⑰ φ V3 (NORMAL)
0.5V/2ms



3-9 ⑰ φ V3 (1/500)
0.5V/2ms

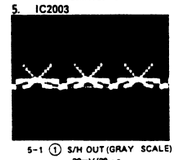


3-2 ⑮ φ V1 (NORMAL)
0.5V/2ms



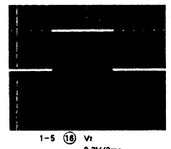
4-2 ⑫ S/H IC OUT
(GRAY SCALE)
20mV/20 μ s

5. IC2003

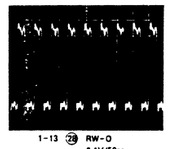


5-1 ① S/H OUT (GRAY SCALE)
20mV/20 μ s

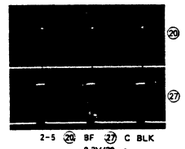
3-10 ⑰ φ V3 (1/1000)
0.5V/2ms



1-5 ⑱ Vt
0.2V/2ms

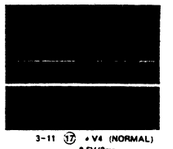


1-13 ㉘ RW-O
0.1V/50ns



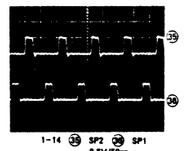
2-5 ⑳ BF ㉗ C BLK
0.2V/20 μ s

3-3 ⑮ φ V1 (1/500)
0.5V/2ms

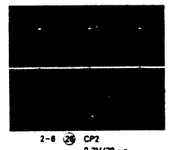


3-11 ⑰ φ V4 (NORMAL)
0.5V/2ms

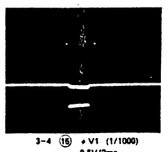
1-6 ⑲ Vt
0.2V/2ms



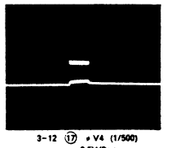
1-14 ㉟ SP2 ㊱ SP1
0.5V/50ns



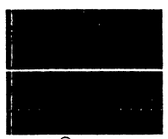
2-6 ㉙ CP2
0.2V/20 μ s



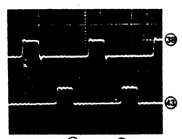
3-4 ⑮ φ V1 (1/1000)
0.5V/2ms



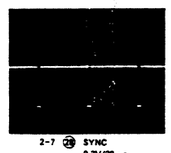
3-12 ⑰ φ V4 (1/500)
0.5V/2ms



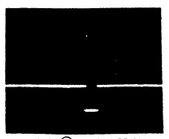
1-7 ㉑ Vt
0.2V/2ms



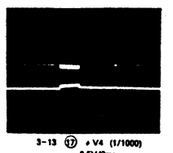
1-15 ㊲ CSP2 ㊸ CSP1
0.5V/50ns



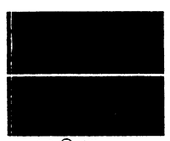
2-7 ㉘ SYNC
0.2V/20 μ s



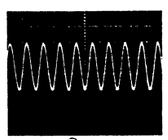
3-5 ⑱ φ V2 (NORMAL)
0.5V/2ms



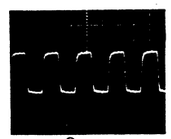
3-13 ⑰ φ V4 (1/1000)
0.5V/2ms



1-8 ㉑ CH1
0.2V/2ms



1-16 ㊹ XI
50mV/50ns



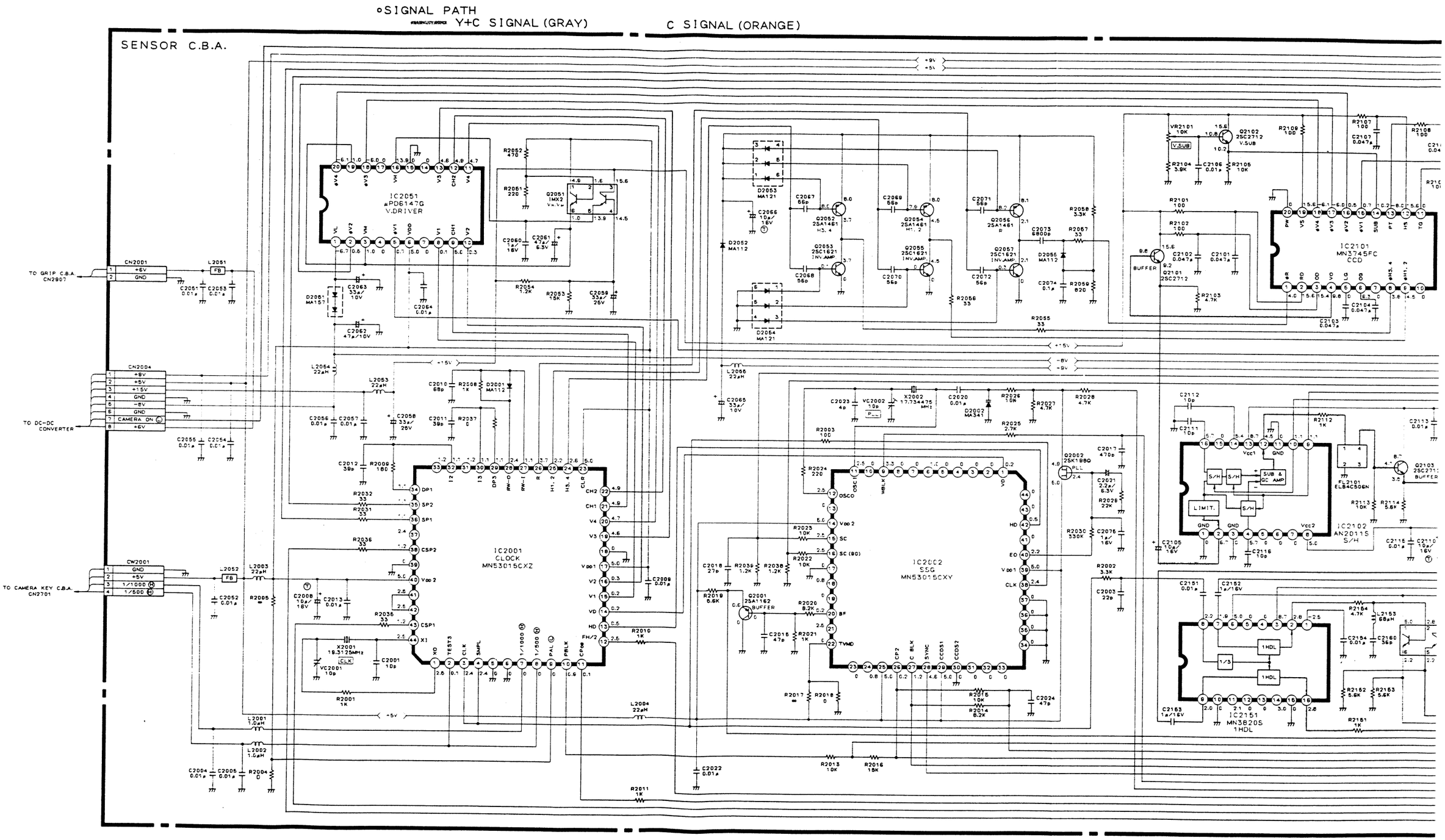
2-8 ㉚ CLK
0.2V/50ns

3-6 ⑰ φ V2 (1/500)
0.5V/2ms

4. IC2102

4-1 ④ S/H IC IN (GRAY SCALE)
20mV/20 μ s

SCHEMATIC DIAGRAM
SENSOR C.B.A.



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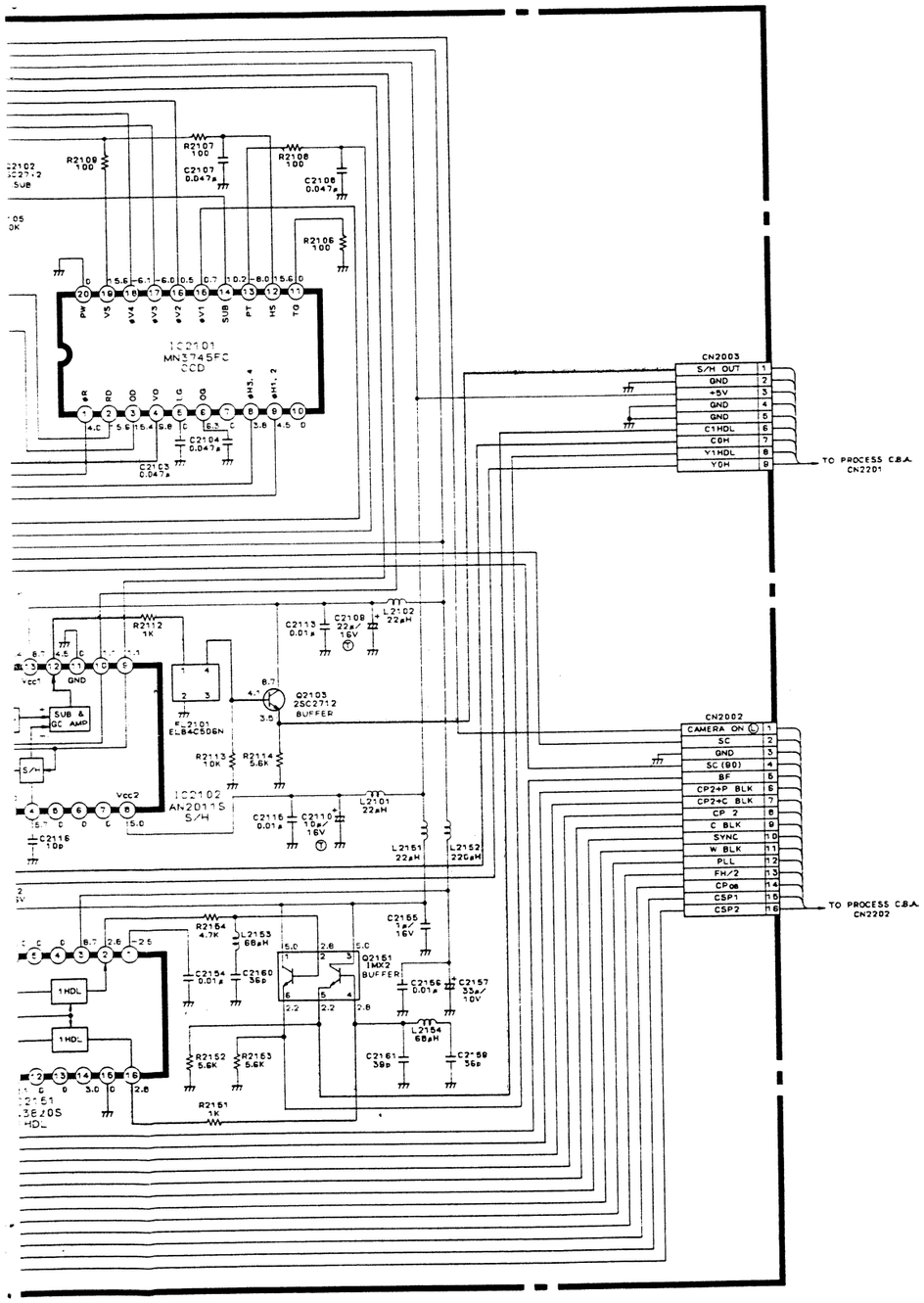
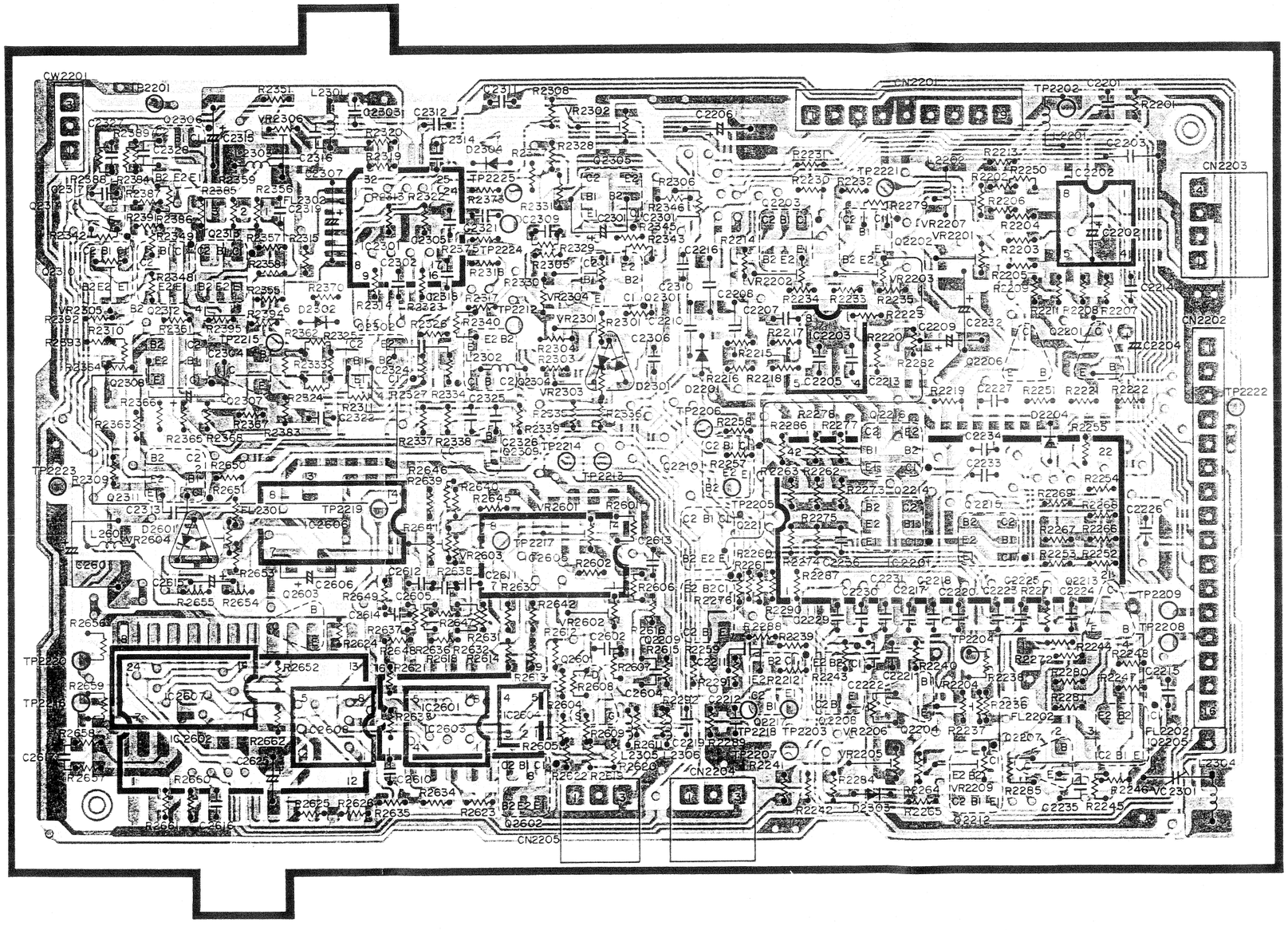
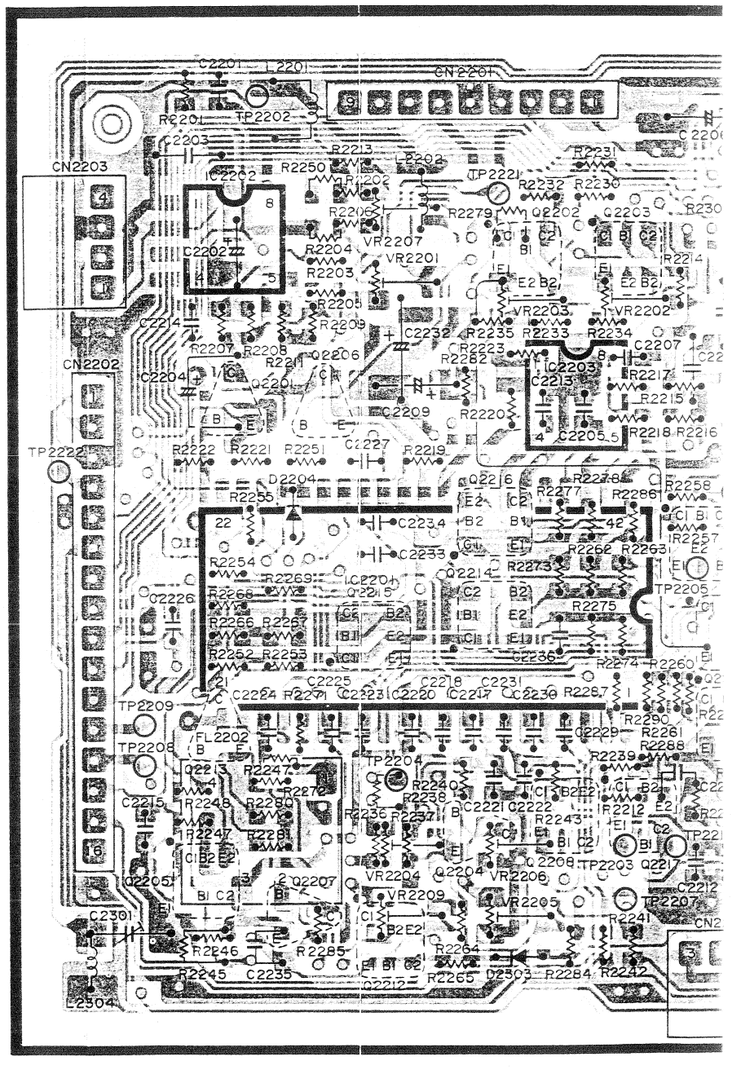


CIRCUIT BOARD DIAGRAM
PROCESS • CAMERA-KEY C.B.A.

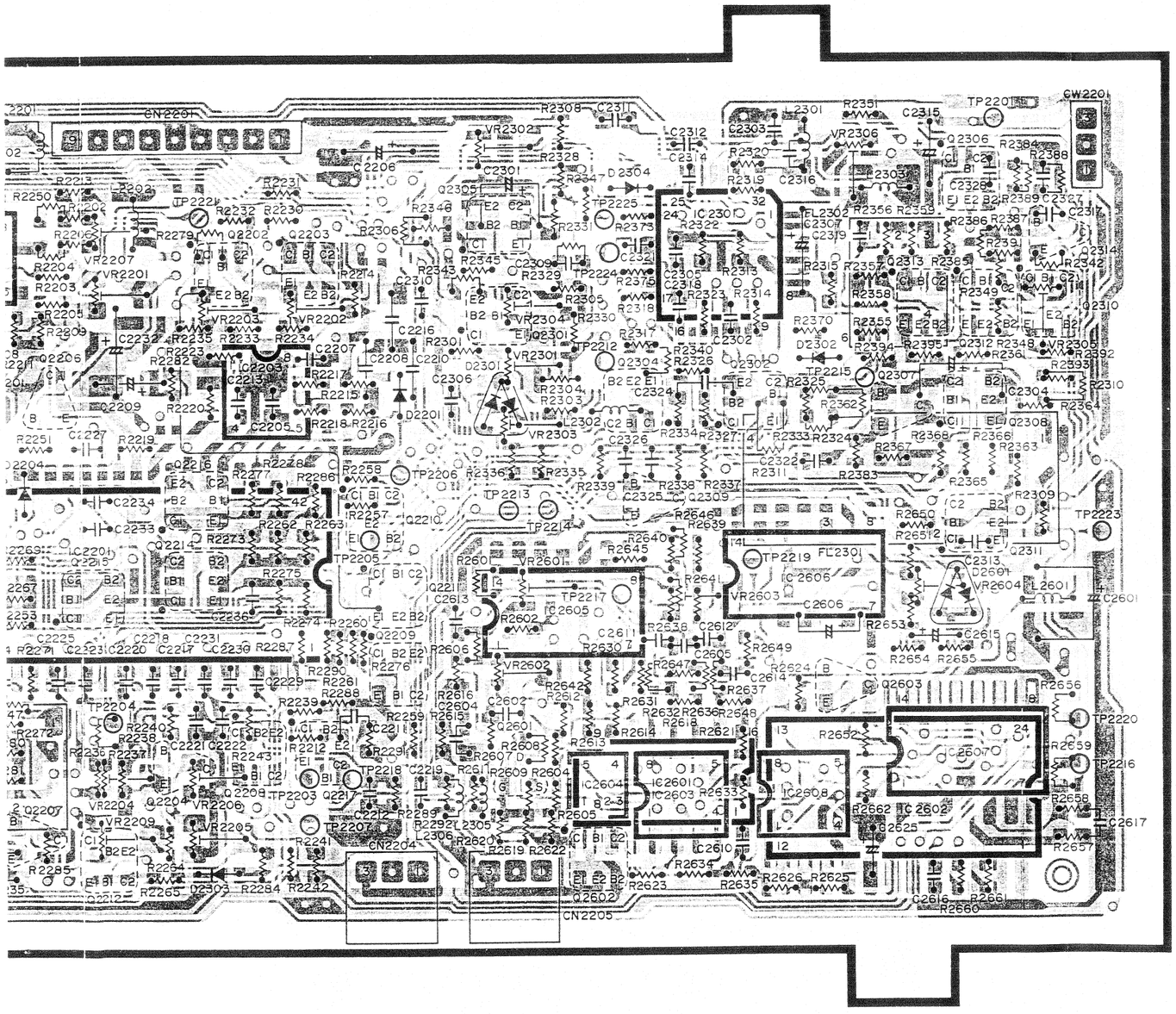
PROCESS C.B.A. (COMPONENT SIDE)



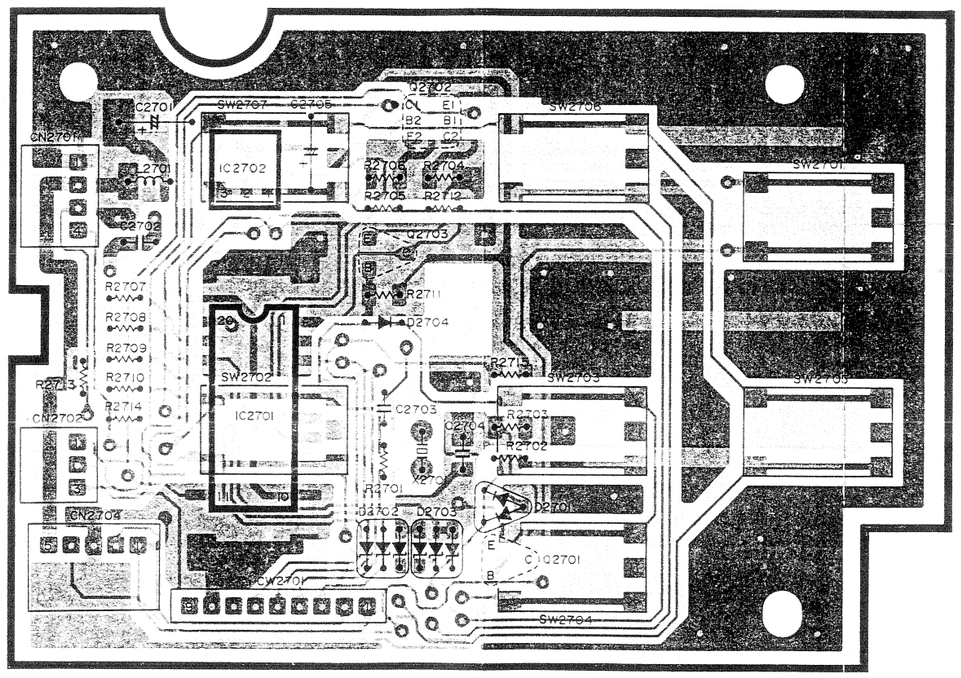
PROCESS C.B.A. (SOLDERING SIDE



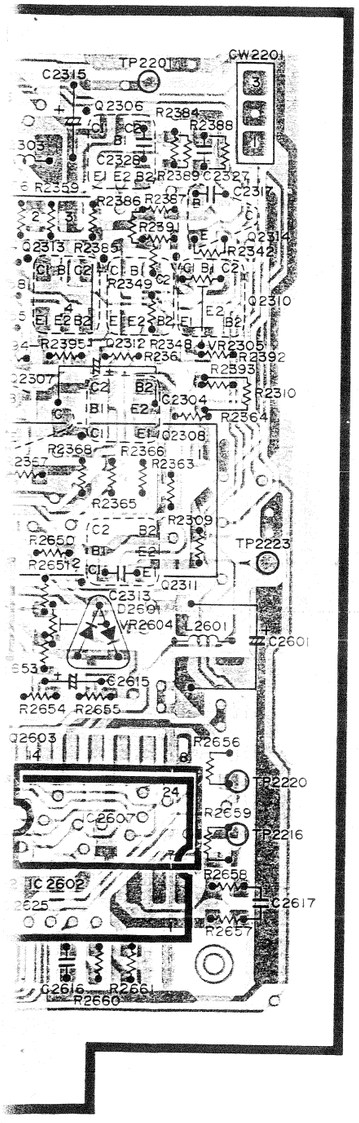
.A. (SOLDERING SIDE)



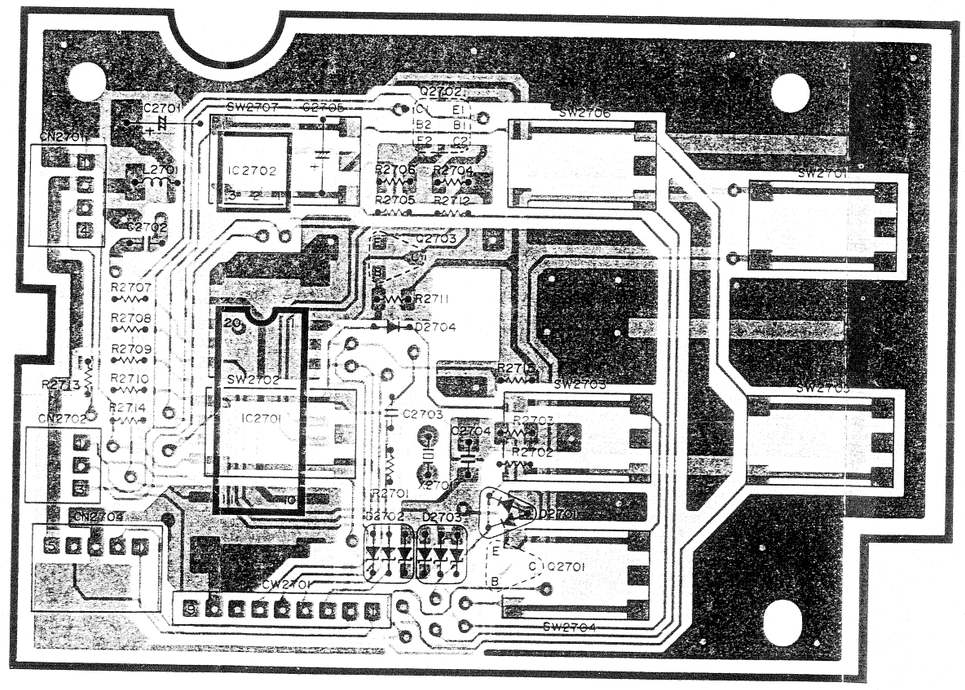
CAMERA-KEY C.B.A.



SI

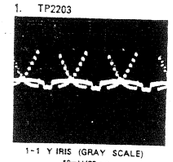


CAMERA–KEY C.B.A.

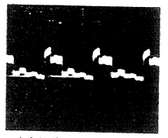


SIGNAL WAVE

1. TP2203

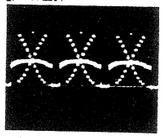


1-1 Y IRIS (GRAY SCALE) 10mV/20μs

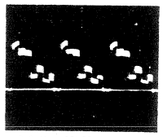


1-2 Y IRIS (COLOR BAR) 10mV/20μs

2. TP2204

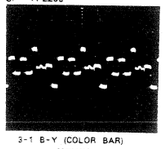


2-1 Y_F (GRAY SCALE) 10mV/20μs



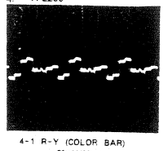
2-2 Y_F (COLOR BAR) 10mV/20μs

3. TP2205



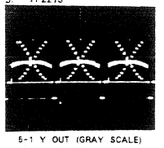
3-1 B-Y (COLOR BAR) 20mV/20μs

4. TP2206



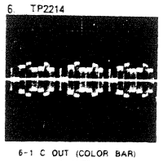
4-1 R-Y (COLOR BAR) 20mV/20μs

5. TP2213



5-1 Y OUT (GRAY SCALE) 50mV/20μs

6. TP2214



6-1 C OUT (COLOR BAR) 20mV/20μs

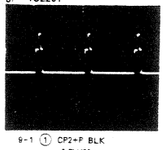
7. TP2224

7-1 B-Y (COLOR BAR) 20mV/20μs

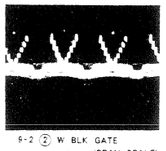
8. TP2225

8-1 R-Y (COLOR BAR) 20mV/20μs

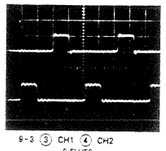
9. IC2201



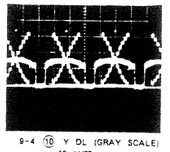
9-1 ① CP2+P BLK 0.2V/20μs



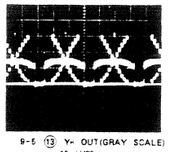
9-2 ② W BLK GATE (GRAY SCALE) 10mV/20μs



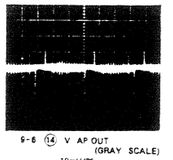
9-3 ③ CH1 ④ CH2 0.5V/50ns



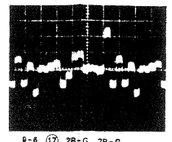
9-4 ⑩ Y DL (GRAY SCALE) 10mV/20μs



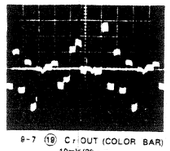
9-5 ⑬ Y- OUT(GRAY SCALE) 10mV/20μs



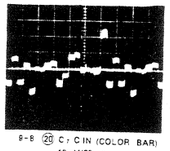
9-6 ⑭ V AP OUT (GRAY SCALE) 10mV/20μs



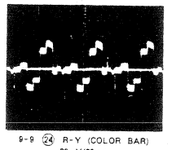
9-6 ⑰ 2R-G, 2B-G (COLOR BAR) 10mV/20μs



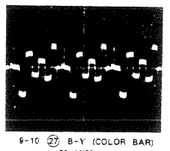
9-7 ⑲ C_F OUT (COLOR BAR) 10mV/20μs



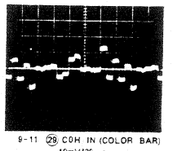
9-8 ⑳ C_F C IN (COLOR BAR) 10mV/20μs



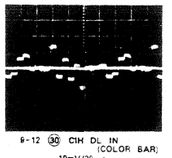
9-9 ㉔ R-Y (COLOR BAR) 20mV/20μs



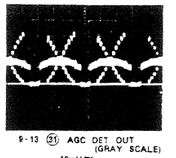
9-10 ㉗ B-Y (COLOR BAR) 20mV/20μs



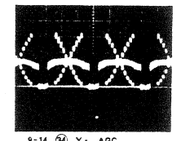
9-11 ㉙ C0H IN (COLOR BAR) 10mV/20μs



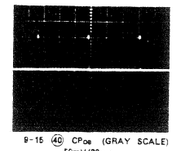
9-12 ㉚ C1H DL IN (COLOR BAR) 10mV/20μs



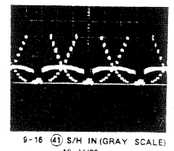
9-13 ㉛ AGC DET OUT (GRAY SCALE) 10mV/20μs



9-14 ㉞ Y_F AGC (GRAY SCALE) 10mV/20μs

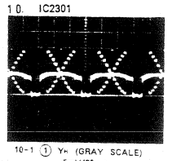


9-15 ㊵ CP∞ (GRAY SCALE) 50mV/20μs



9-16 ㊶ S/H IN (GRAY SCALE) 10mV/20μs

10. IC2301



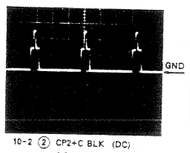
10-1 ① Y+ (GRAY SCALE) 5mV/20μs

10-6 ㉖ Y+AP IN (GRAY SCALE) 20mV/20μs

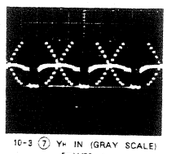
10-7 ㉔ BF 20mV/20μs

10-8 ㉖ SC ㉗ SC (INV) 20mV/0.2μs

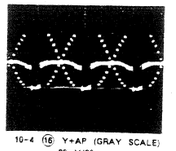
10-9 ㉛ C+BURST (COLOR BAR) 20mV/0.2μs



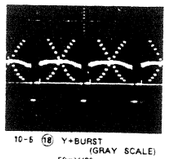
10-2 ② CP2+C BLK (DC) 0.2V/20μs



10-3 ⑦ Y+ IN (GRAY SCALE) 5mV/20μs

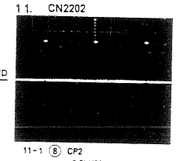


10-4 ⑯ Y+AP (GRAY SCALE) 20mV/20μs

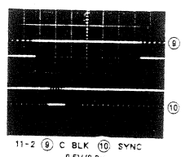


10-5 ⑱ Y+BURST (GRAY SCALE) 50mV/20μs

11. CN2202



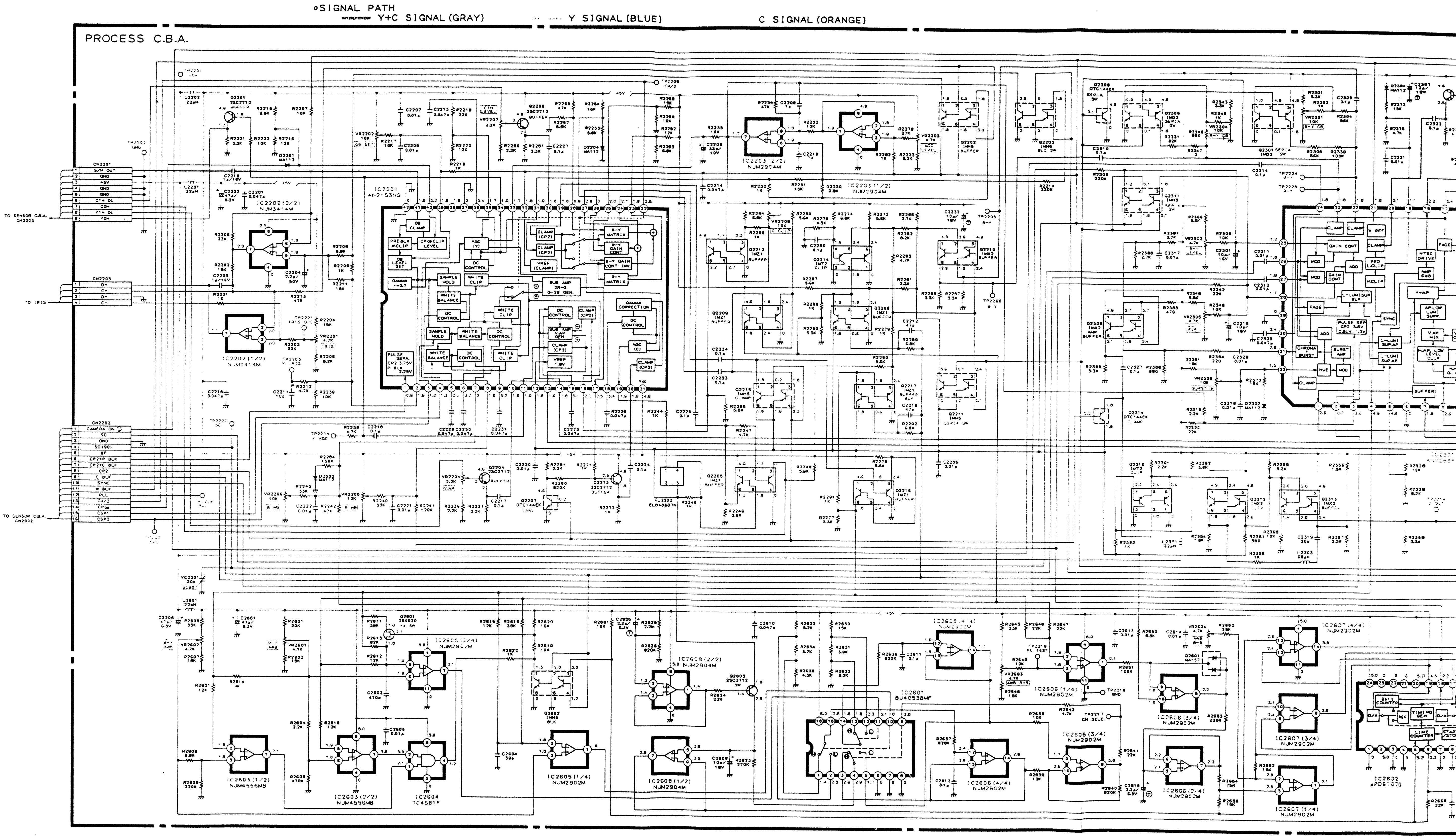
11-1 ⑧ CP2 0.2V/20μs



11-2 ⑨ C BLK ⑩ SYNC 0.5V/0.2ms

11-3 ⑪ W BLK 0.2V/20μs

SCHEMATIC DIAGRAM
PROCESS • CAMERA-KEY C.B.A.



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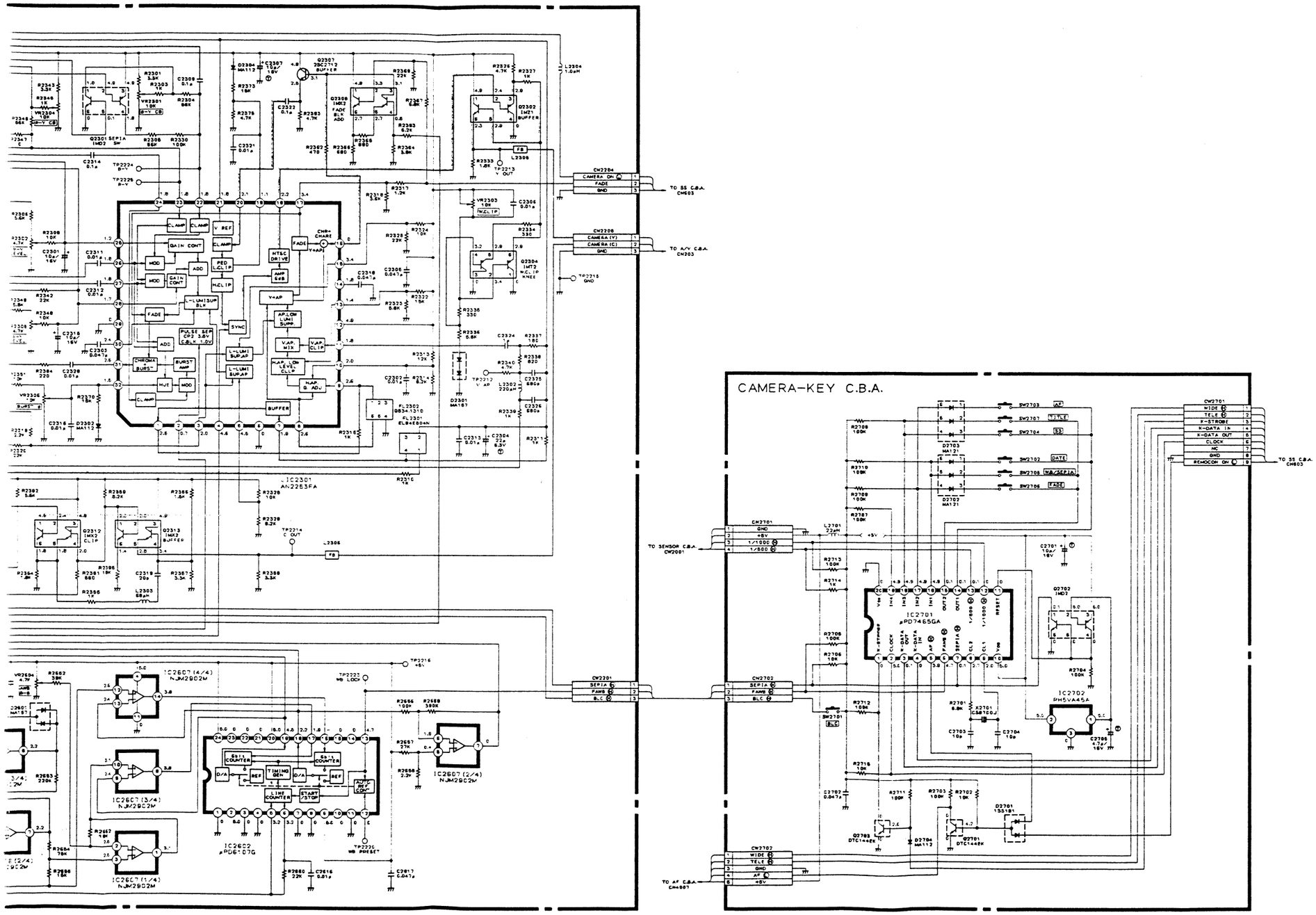
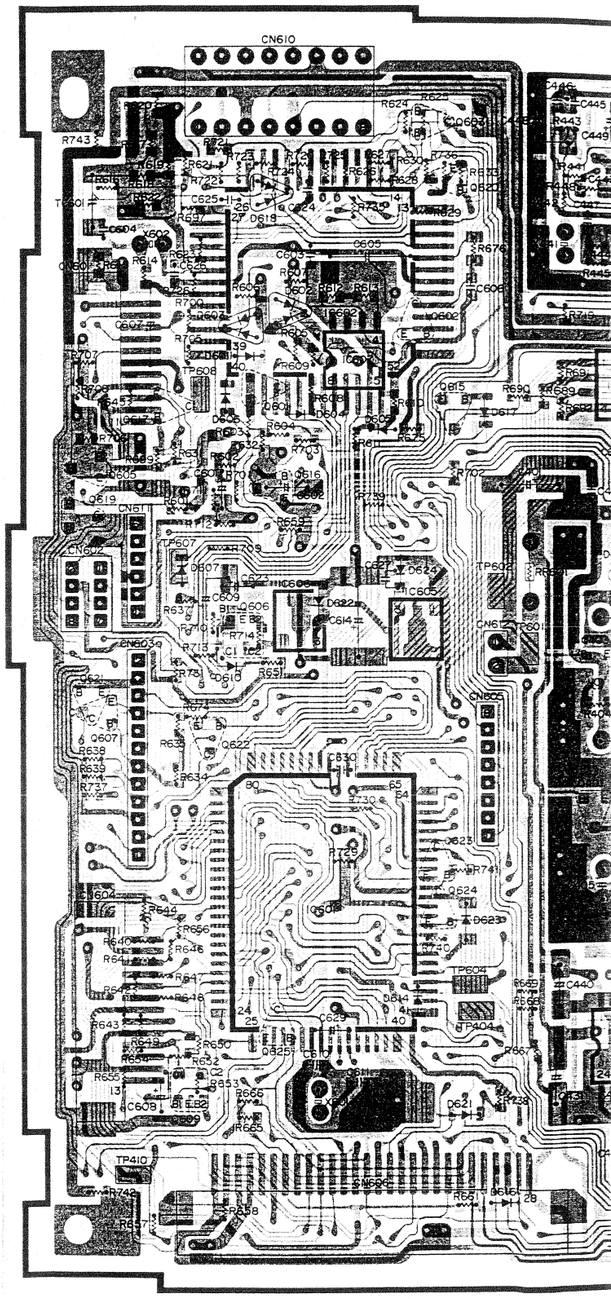
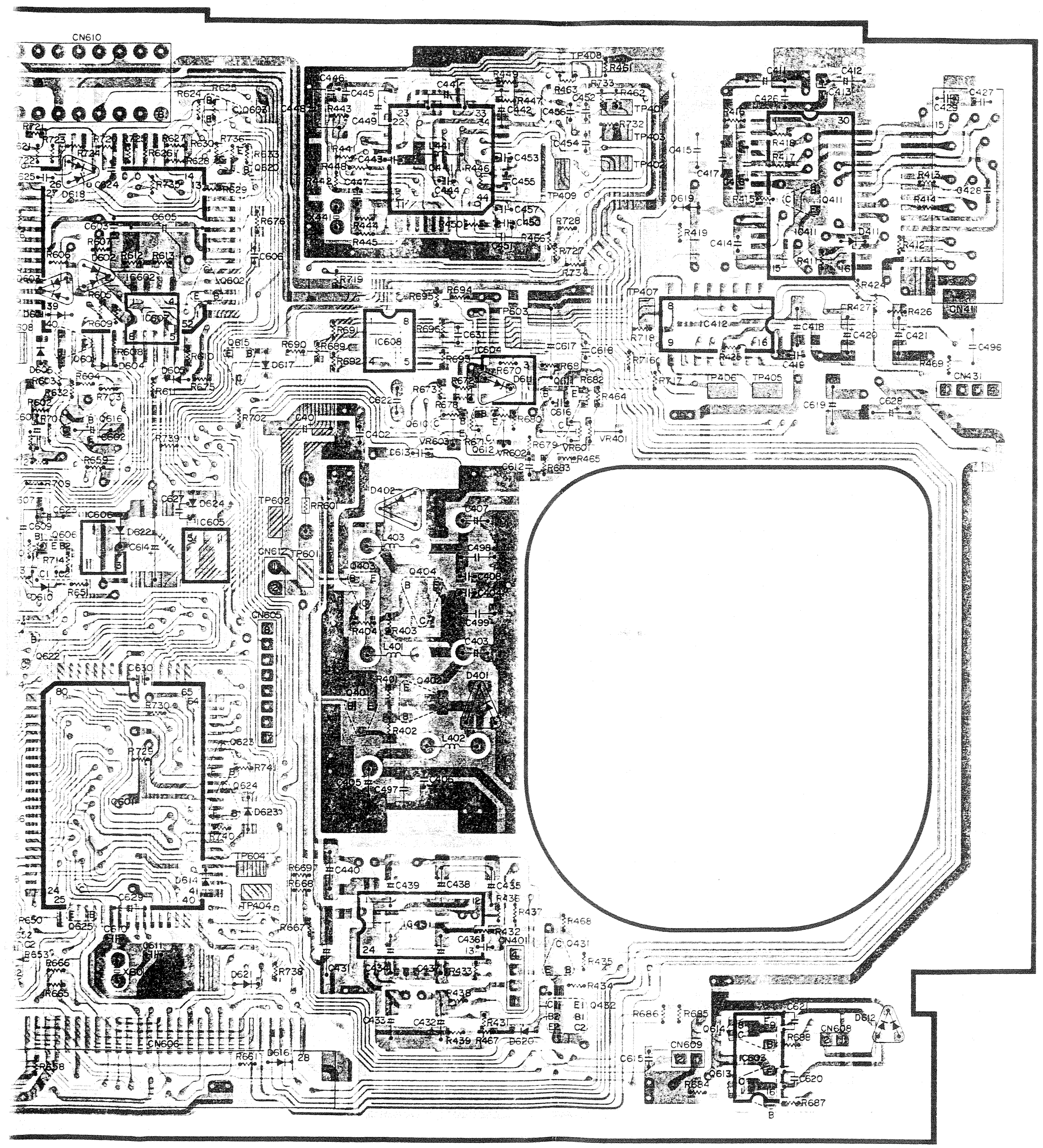


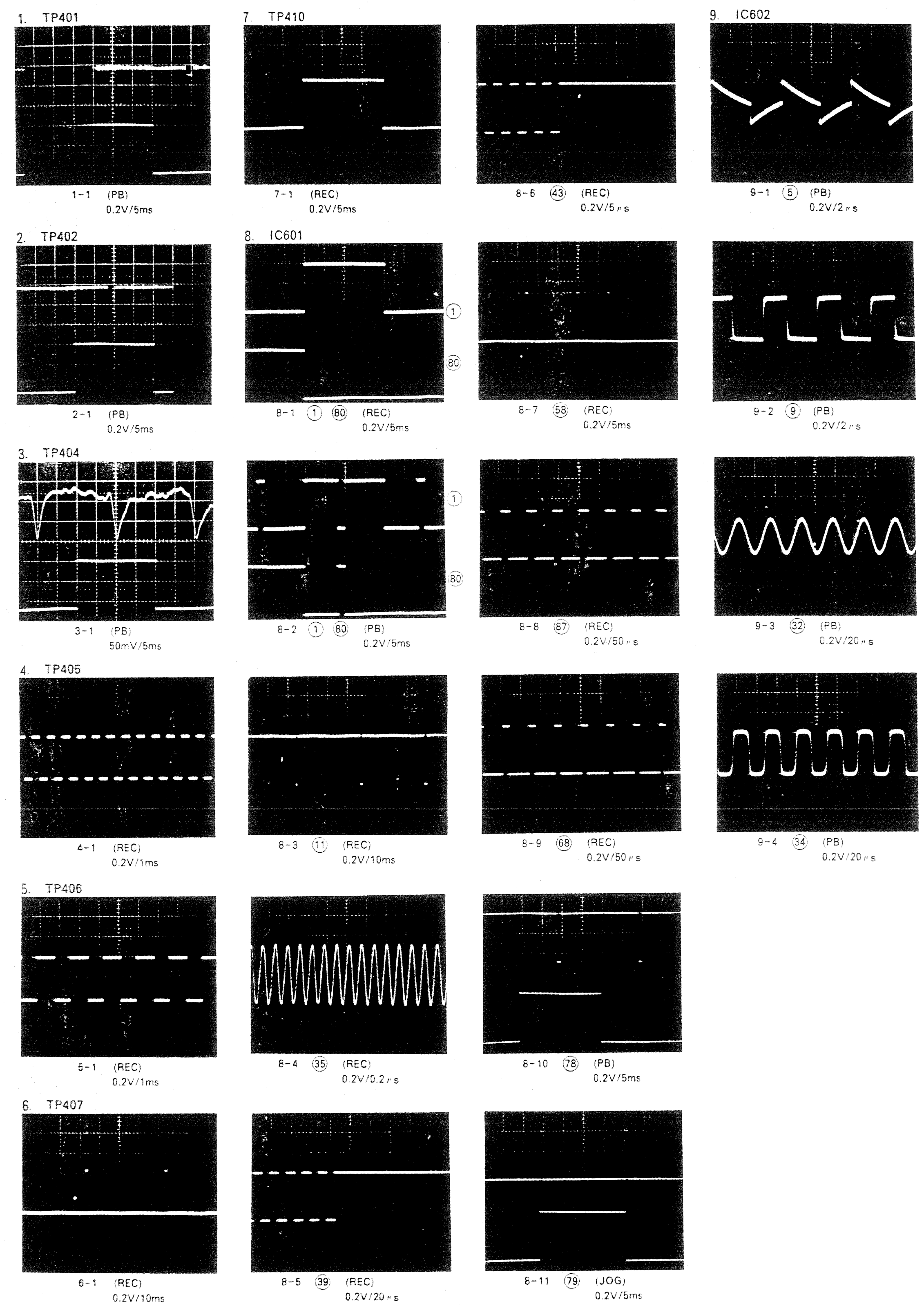
CIRCUIT BOARD DIAGRAM
SYSCON-SERVO C.B.A.



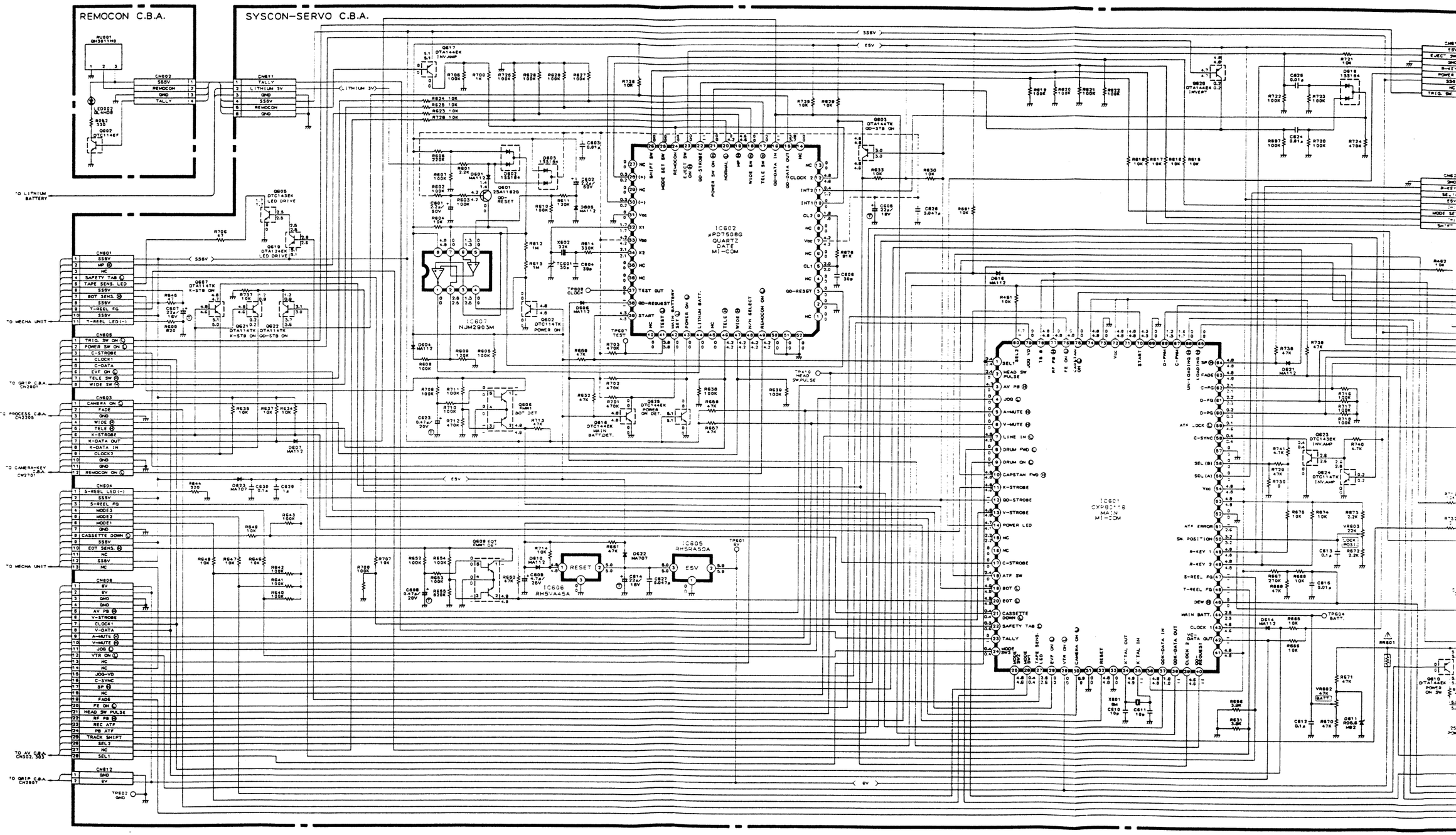
RD DIAGRAM
RVO C.B.A.



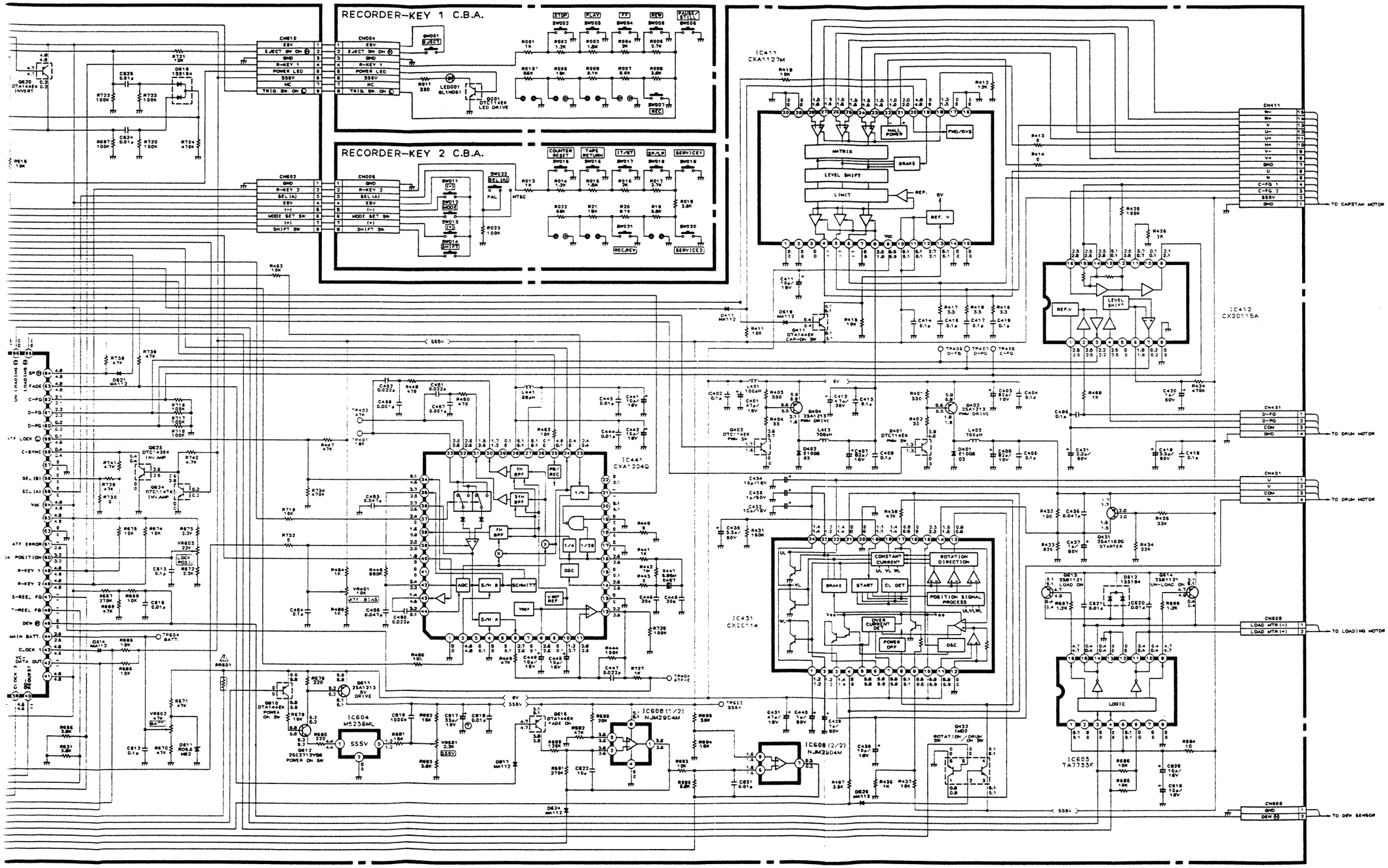
SIGNAL WAVE



SCHEMATIC DIAGRAM
SYSCON-SERVO C.B.A.

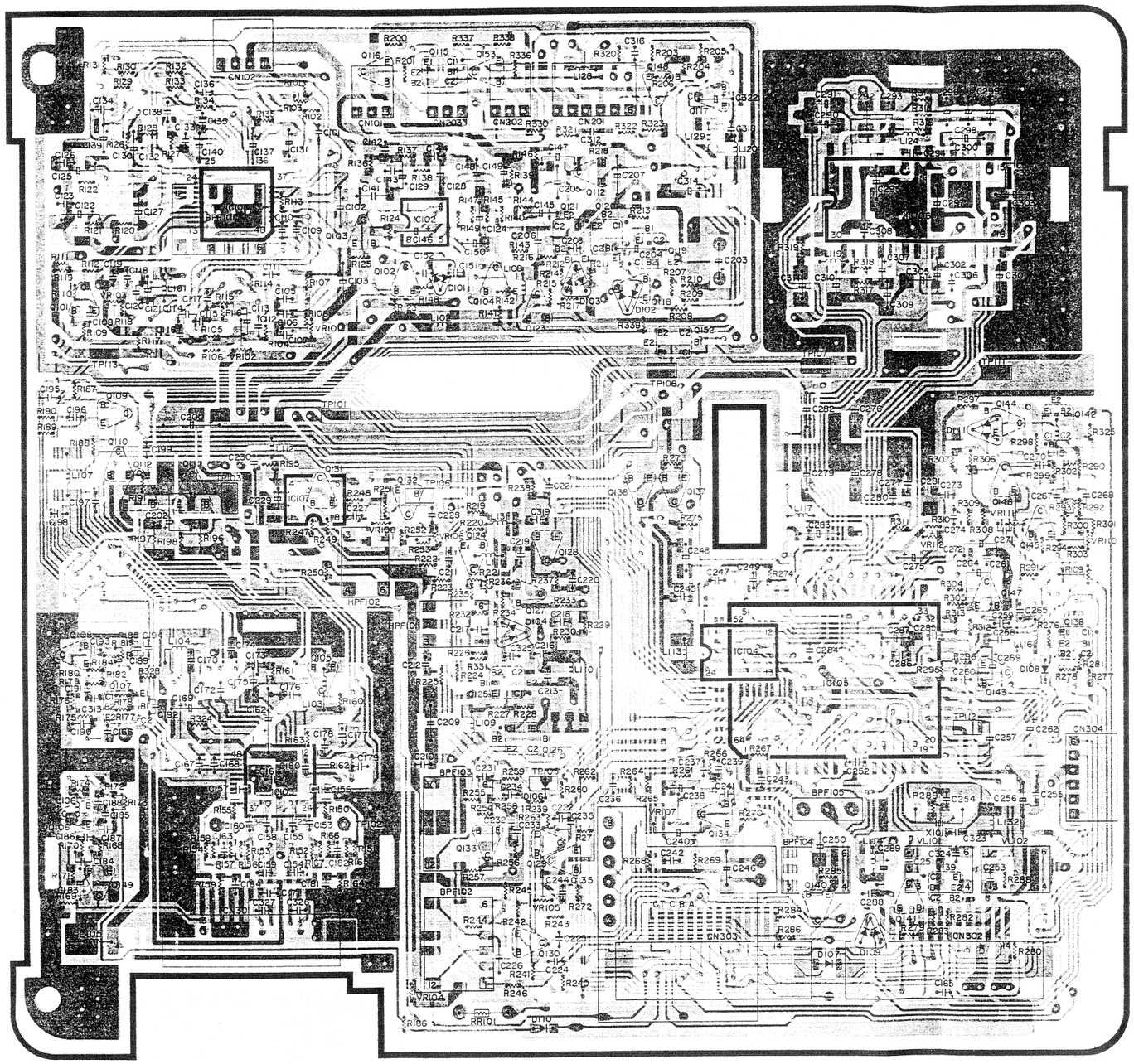


01 Feb. 1989

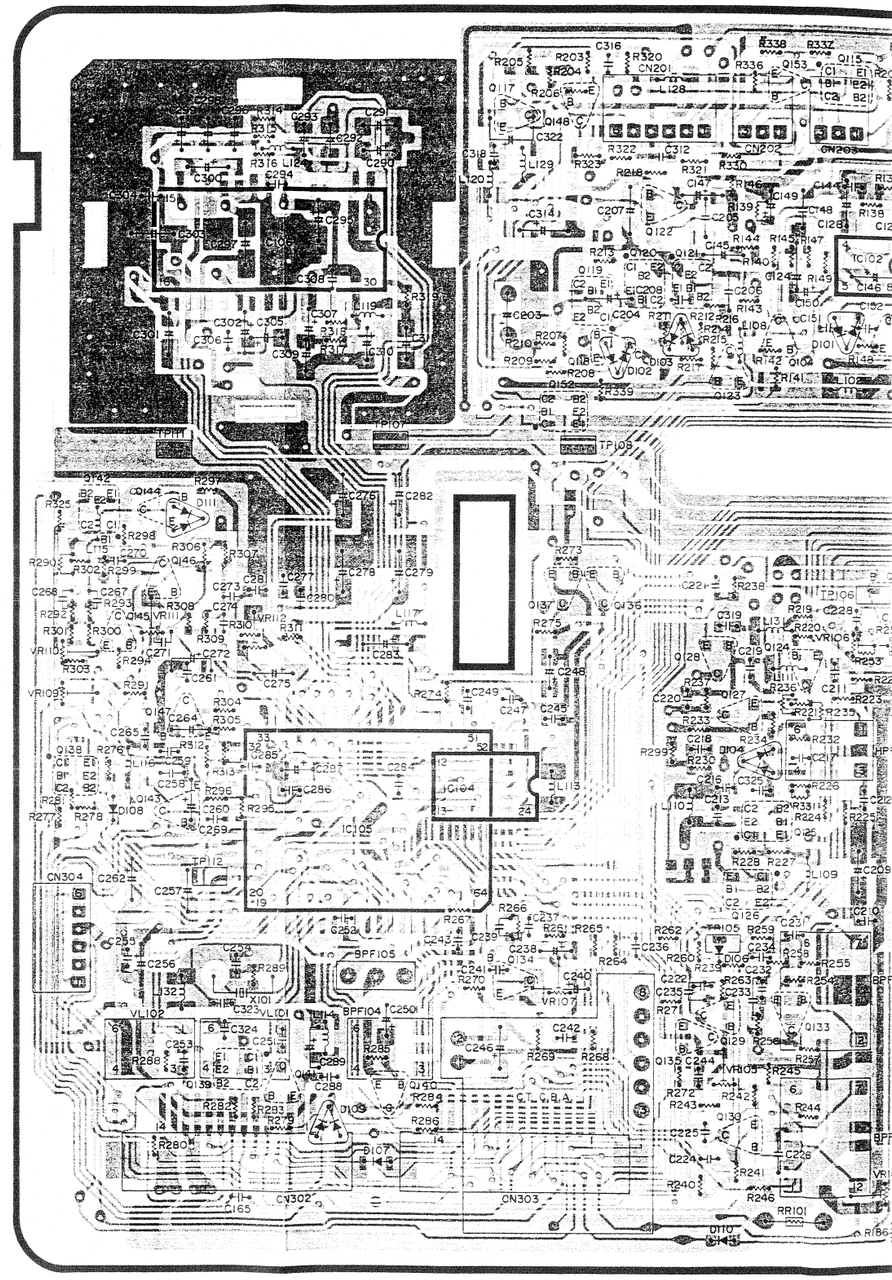

RECORDER-KEY 1 C.B.A.
RECORDER-KEY 2 C.B.A.
IC411 CXA1127M
IC412 CX20115A
IC441 CXA2040
IC431 CX20114
IC604 M5236ML
IC608 (1/2) NJM2904M
IC608 (2/2) NJM2904M
IC603 TA7733F
TO CAPSTAN MOTOR
TO DRUM MOTOR
TO DRUM MOTOR
TO LOADING MOTOR
TO DEW SENSOR
© CANON INC. 1989

CIRCUIT BOARD DIAGRAM
AUDIO-VIDEO C.B.A.

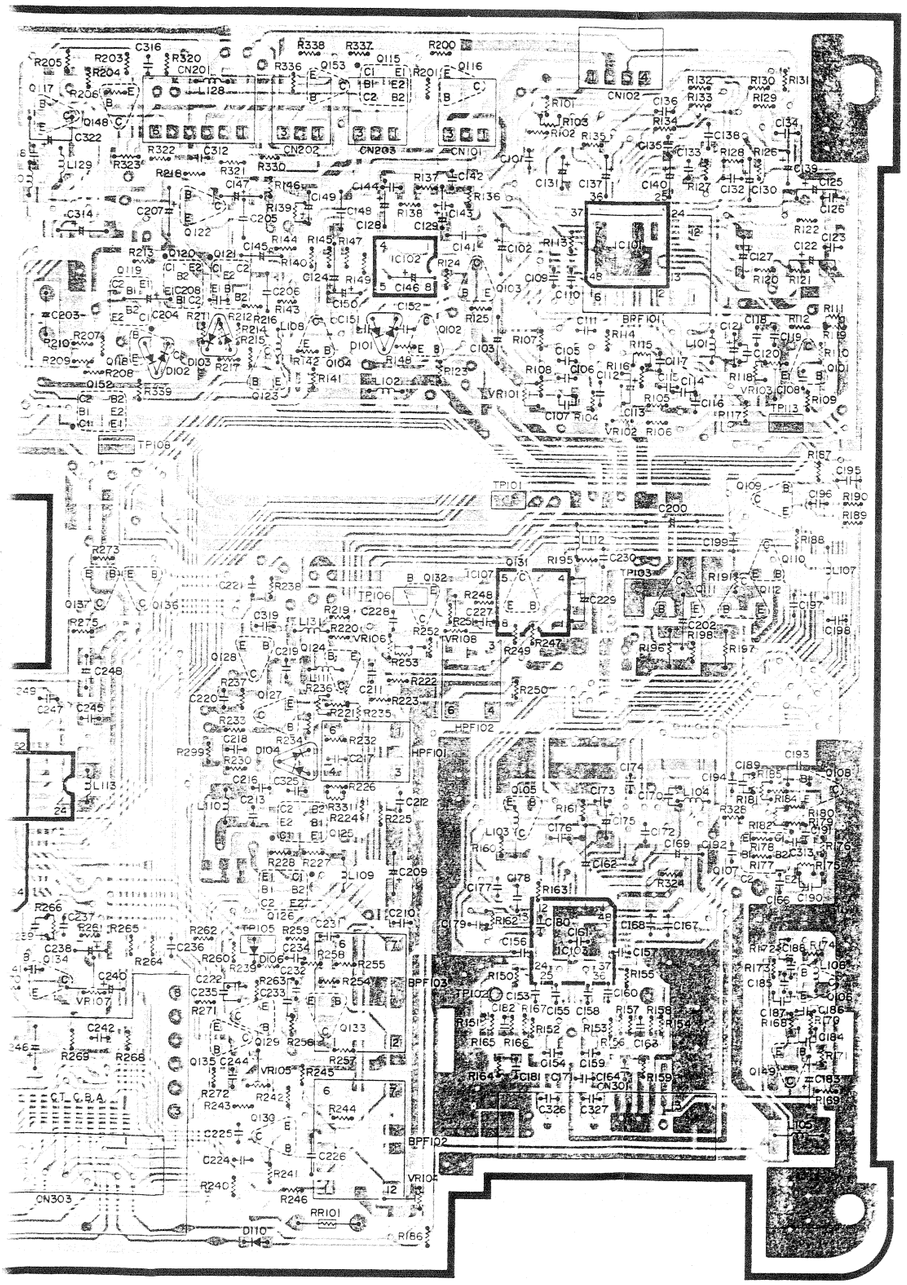
AUDIO–VIDEO C.B.A. (COMPONENT SIDE)



AUDIO–VIDEO C.B.A. (SOLDERING SIDE)



SOLDERING SIDE)



SIGNAL WAVE

1. TP102
1-1. CH-1 (REC) 20mV/5ms

2. TP105
2-1. REC C (REC) 20mV/20μs

3. TP106
3-1. REC Y (REC) 20mV/20μs

4. TP107
4-1. VIDEO IN (REC) 10mV/20μs

5. TP108
5-1. Y+C (PB) 10mV/20μs

6. TP111
6-1. SC (REC) 20mV/0.2μs

7. TP112
7-1. EMPHSIS (REC) 20mV/20μs

8. TP113
8-1. A-FM (REC) 2mV/0.5μs

9. IC101 (MONOSCOPE)
9-1. (2) (PB) 2mV/5ms
9-2. (7) (PB) 20mV/2ms
9-3. (26) (PB) 20mV/2ms

10. IC103
10-1. (2) (REC) 10mV/20μs
10-2. (6) (REC) 20mV/20μs
10-3. (10) (PB) 5mV/5ms
10-4. (16) (PB) 20mV/5ms
10-5. (20) (PB) 5mV/5ms

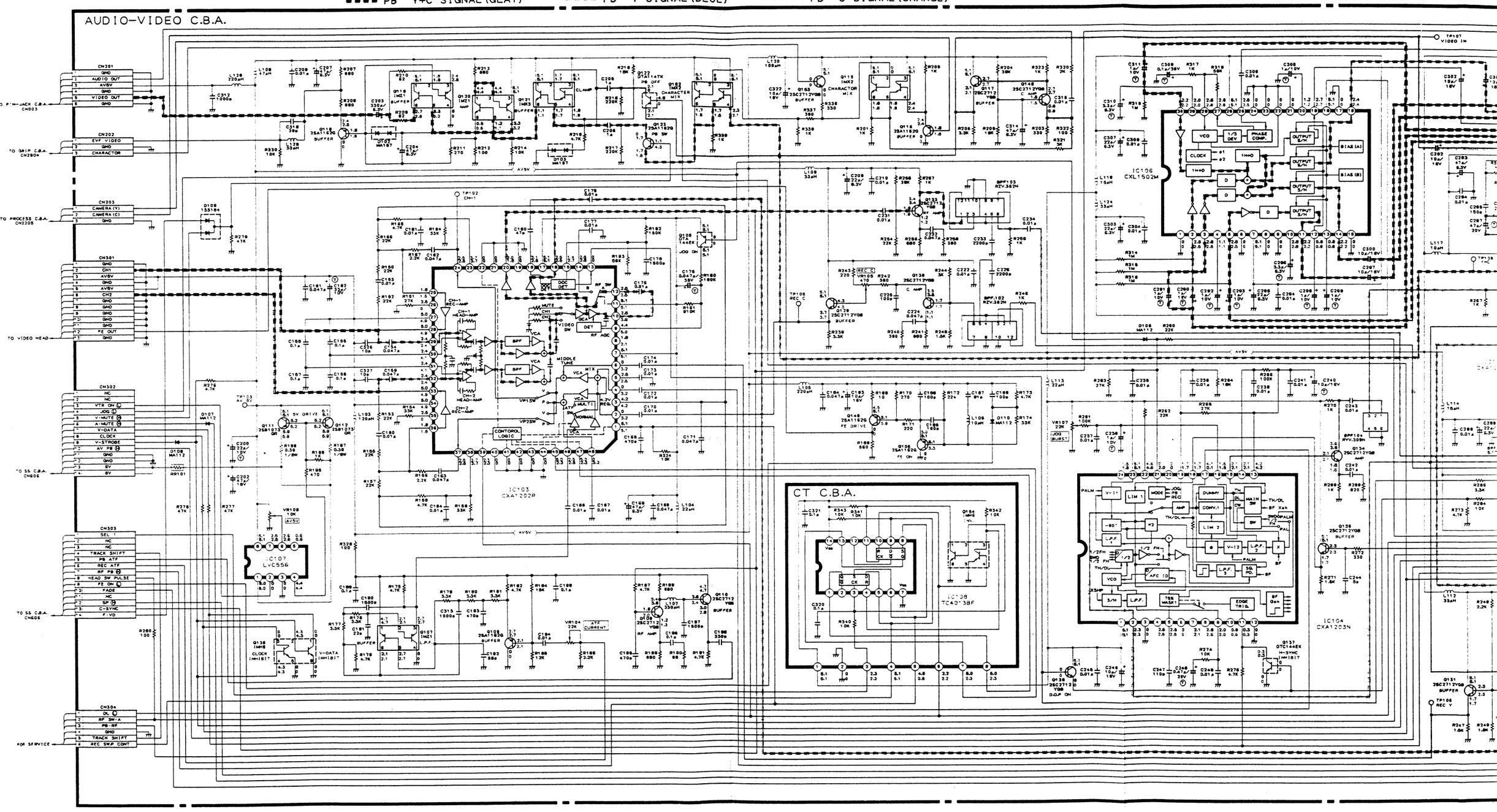
11. IC104
11-1. (2) (PB) 10mV/20μs
11-2. (15) (PB) 10mV/20μs
11-3. (5) (REC) 20mV/20μs
11-4. (8) (REC) 50mV/20μs

12. IC105
12-1. (1) (PB) 5mV/0.2μs
12-2. (3) (PB) 5mV/20μs
12-3. (5) (REC) 20mV/20μs
12-4. (8) (REC) 50mV/20μs
12-5. (10) (PB) 10mV/20μs
12-6. (24) (REC) 20mV/20μs
12-7. (20) (REC) 0.1V/20μs
12-8. (23) (PB) 10mV/20μs
12-9. (30) (REC) 10mV/20μs
12-10. (30) (PB) 10mV/20μs
12-11. (35) (REC) 10mV/20μs
12-12. (35) (PB) 5mV/20μs
12-13. (37) (PB) 5mV/20μs
12-14. (39) (REC) 10mV/20μs
12-15. (39) (PB) 10mV/20μs
12-16. (41) (REC) 10mV/20μs
12-17. (41) (PB) 10mV/20μs
12-18. (43) (REC) 10mV/20μs
12-19. (43) (PB) 10mV/20μs
12-20. (45) (REC) 10mV/20μs
12-21. (47) (REC) 10mV/20μs
12-22. (47) (PB) 10mV/20μs
12-23. (49) (REC) 10mV/20μs
12-24. (53) (REC) 10mV/20μs
12-25. (53) (PB) 10mV/20μs
12-26. (56) (REC) 20mV/20μs
12-27. (60) (PB) 20mV/20μs

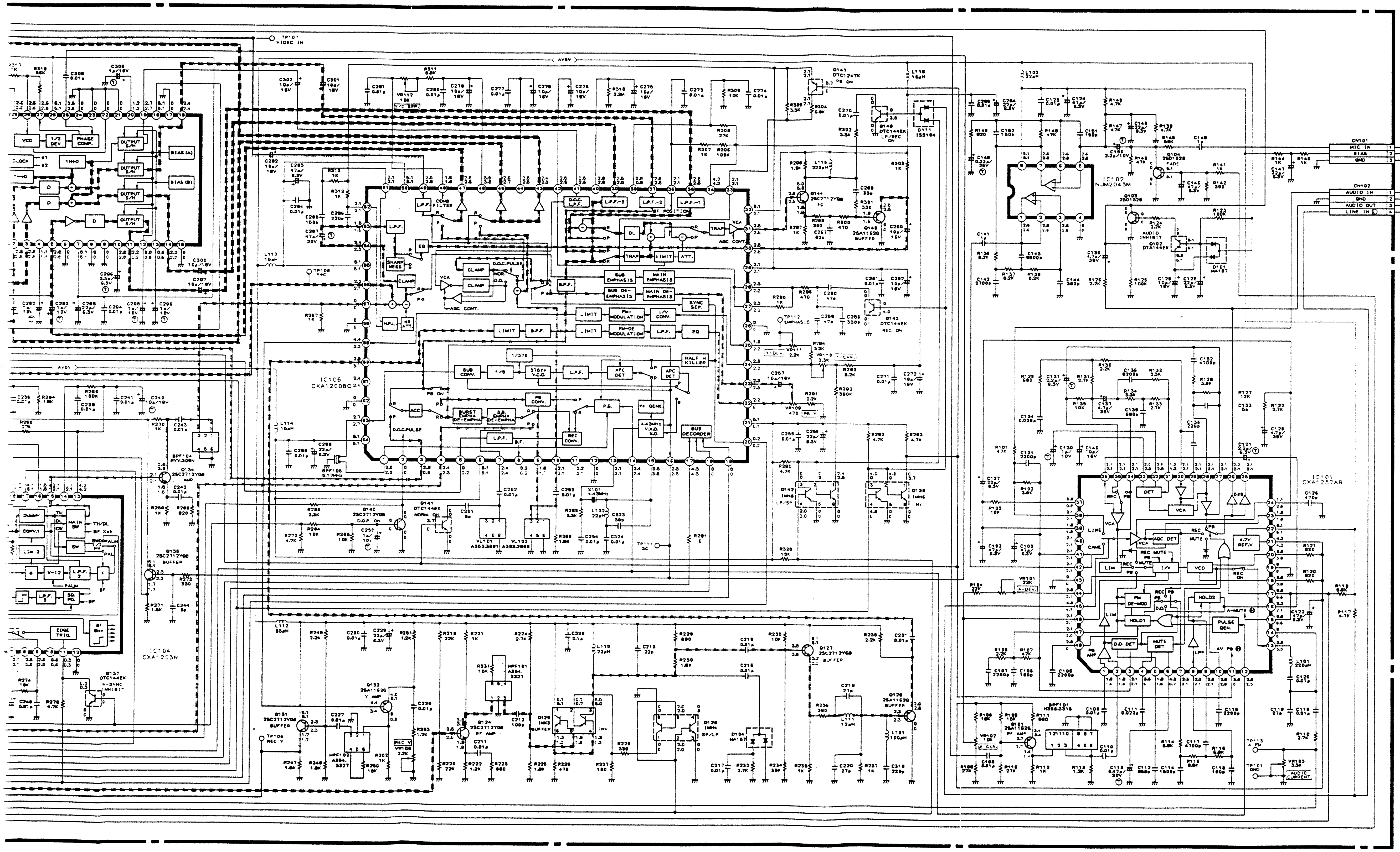
13. CN301
13-1. (12) (REC) 0.5V/0.1μs

SCHEMATIC DIAGRAM
AUDIO-VIDEO C.B.A.

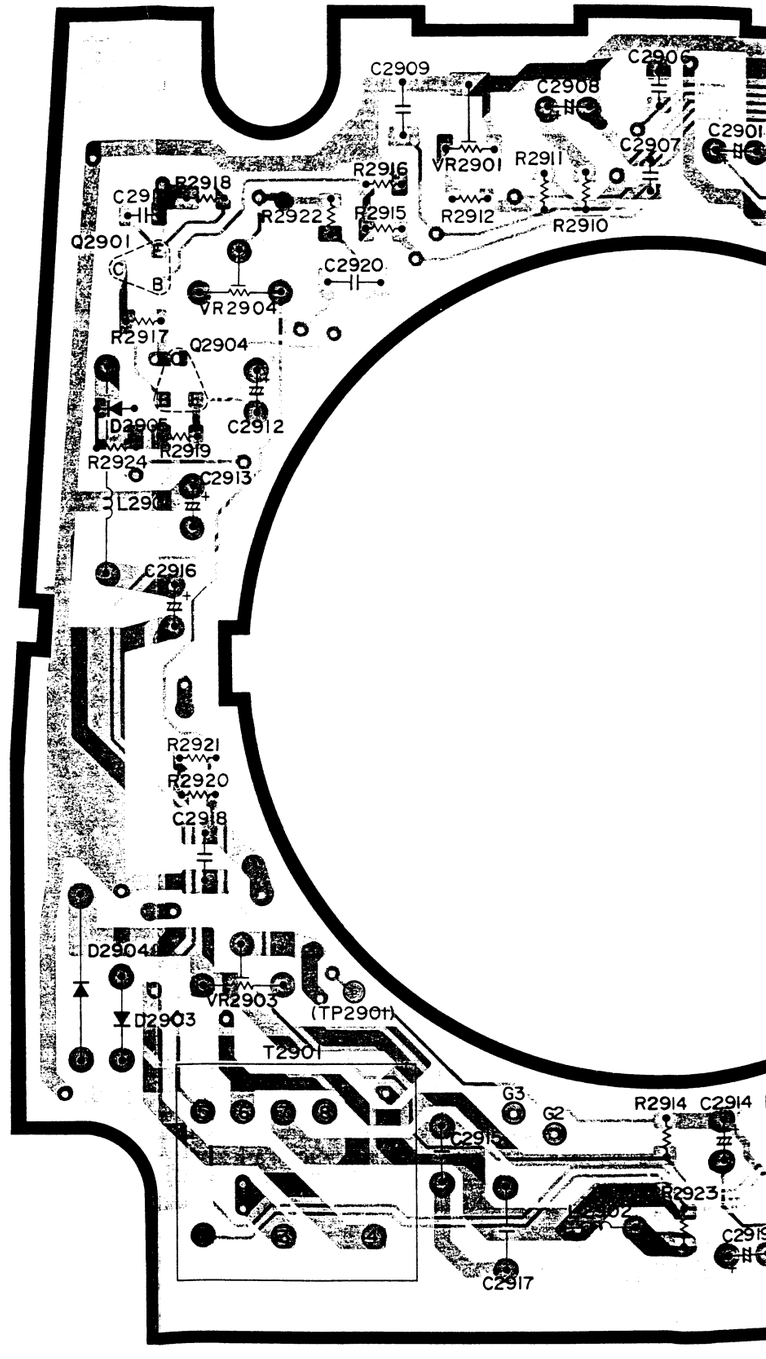
oSIGNAL PATH
REC Y+C SIGNAL (GLAY)
PB Y+C SIGNAL (GLAY)
REC Y SIGNAL (BLUE)
PB Y SIGNAL (BLUE)
REC C SIGNAL (ORANGE)
PB C SIGNAL (ORANGE)



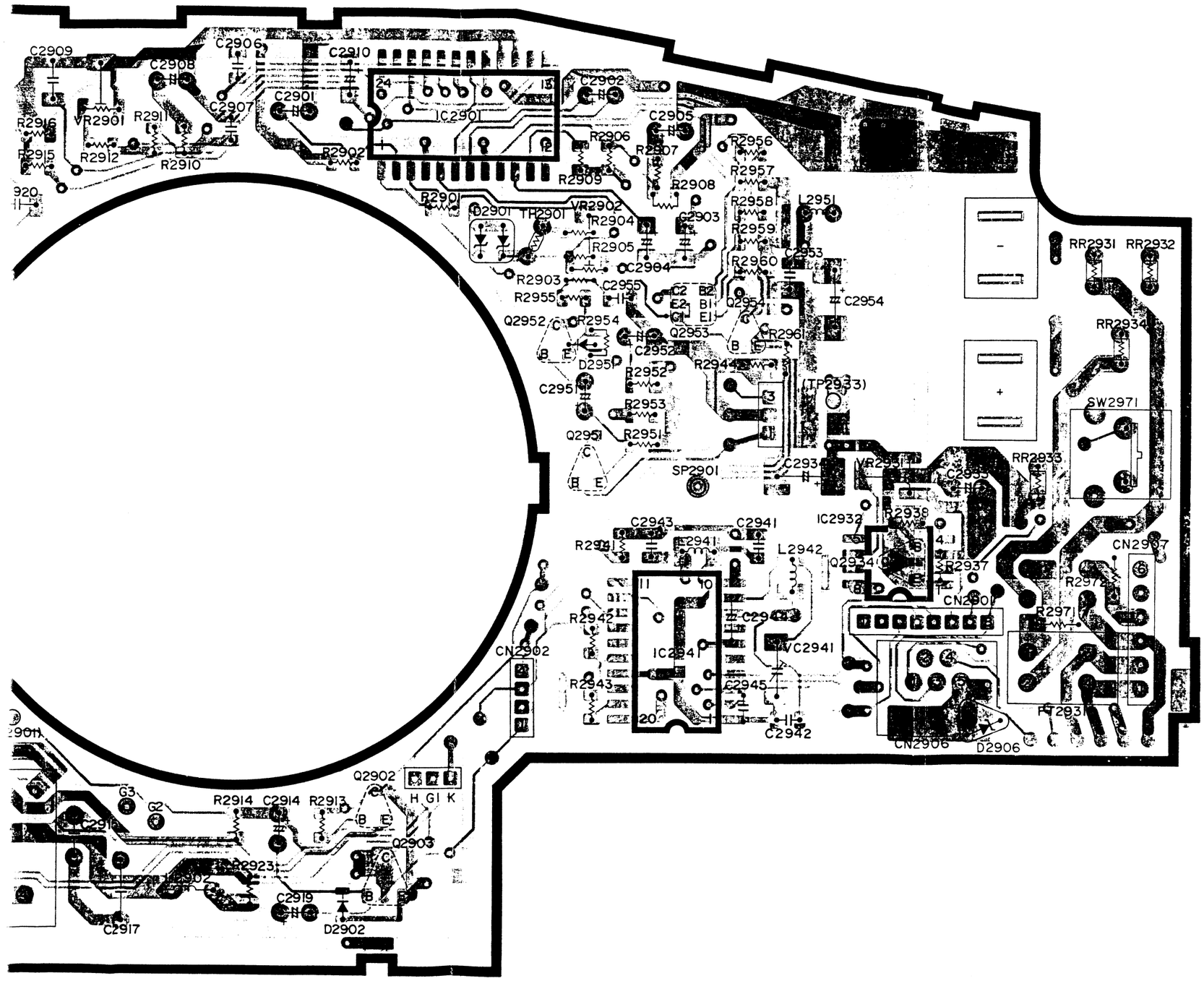
01 Feb. 1989



CIRCUIT BOARD DIAGRAM
GRIP C.B.A.

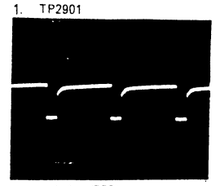


DIAGRAM

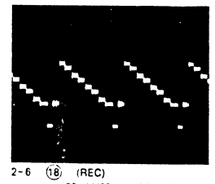


SIGNAL WAVE

1. TP2901

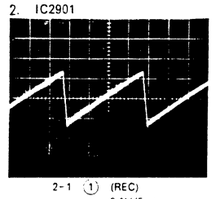


1-1 (REC) 0.1V/20㎳

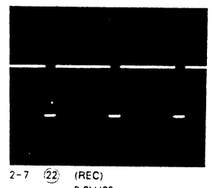


2-6 (18) (REC) 20mV/20㎳ (COLOR BAR)

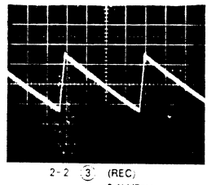
2. IC2901



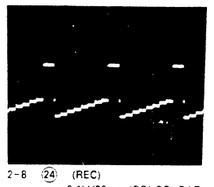
2-1 (1) (REC) 0.1V/5ms



2-7 (22) (REC) 0.2V/20㎳

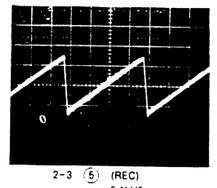


2-2 (3) (REC) 0.1V/5ms

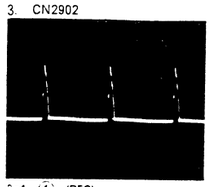


2-8 (24) (REC) 0.1V/20㎳ (COLOR BAR)

3. CN2902

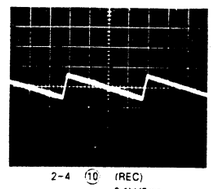


2-3 (5) (REC) 0.1V/5ms

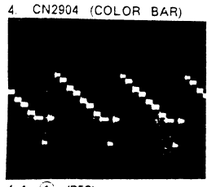


3-1 (1) (REC) 2V/20㎳

4. CN2904 (COLOR BAR)

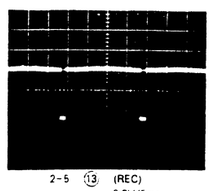


2-4 (10) (REC) 0.1V/5ms

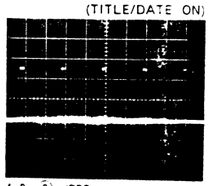


4-1 (1) (REC) 20mV/20㎳

(TITLE/DATE ON)

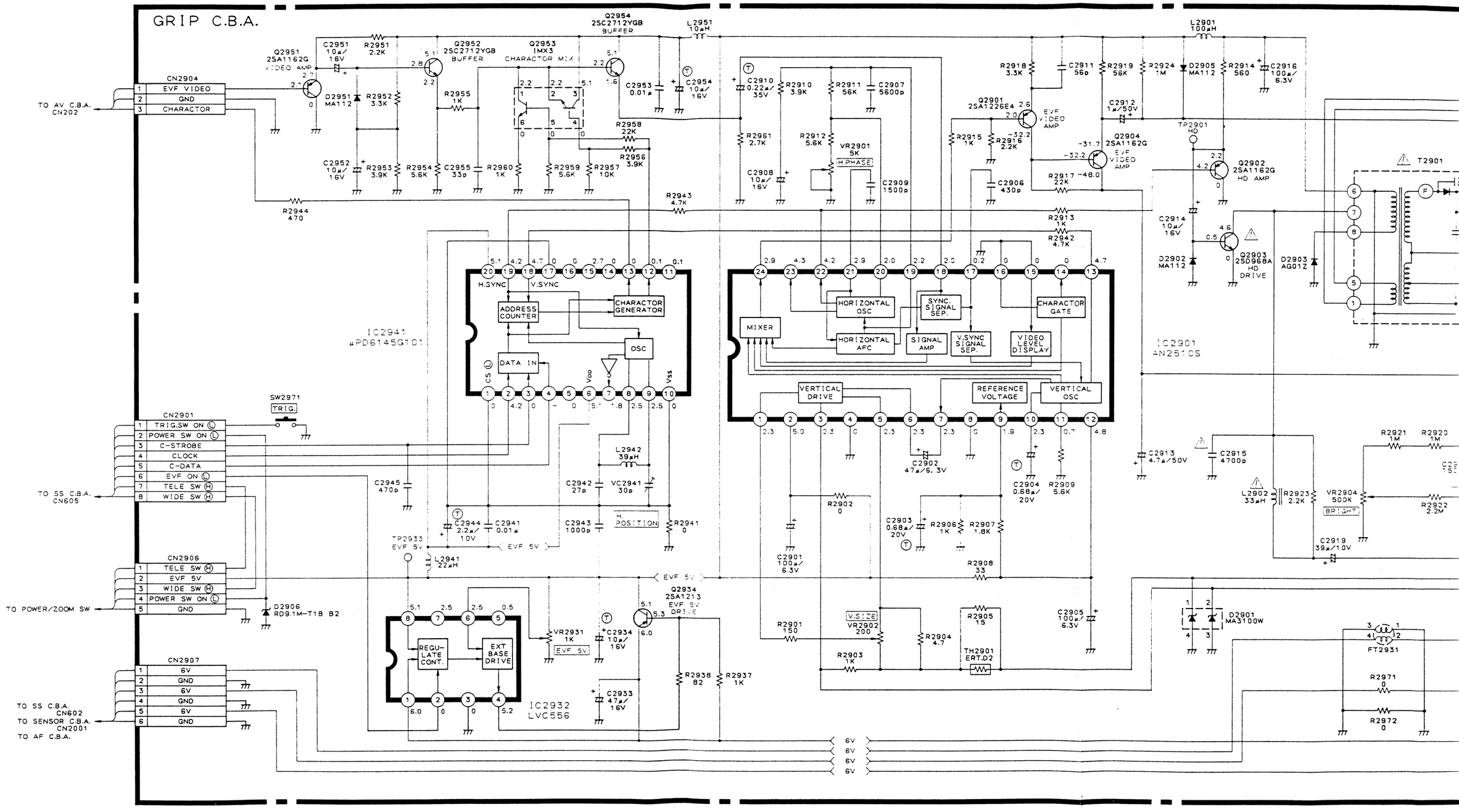


2-5 (13) (REC) 0.2V/5ms

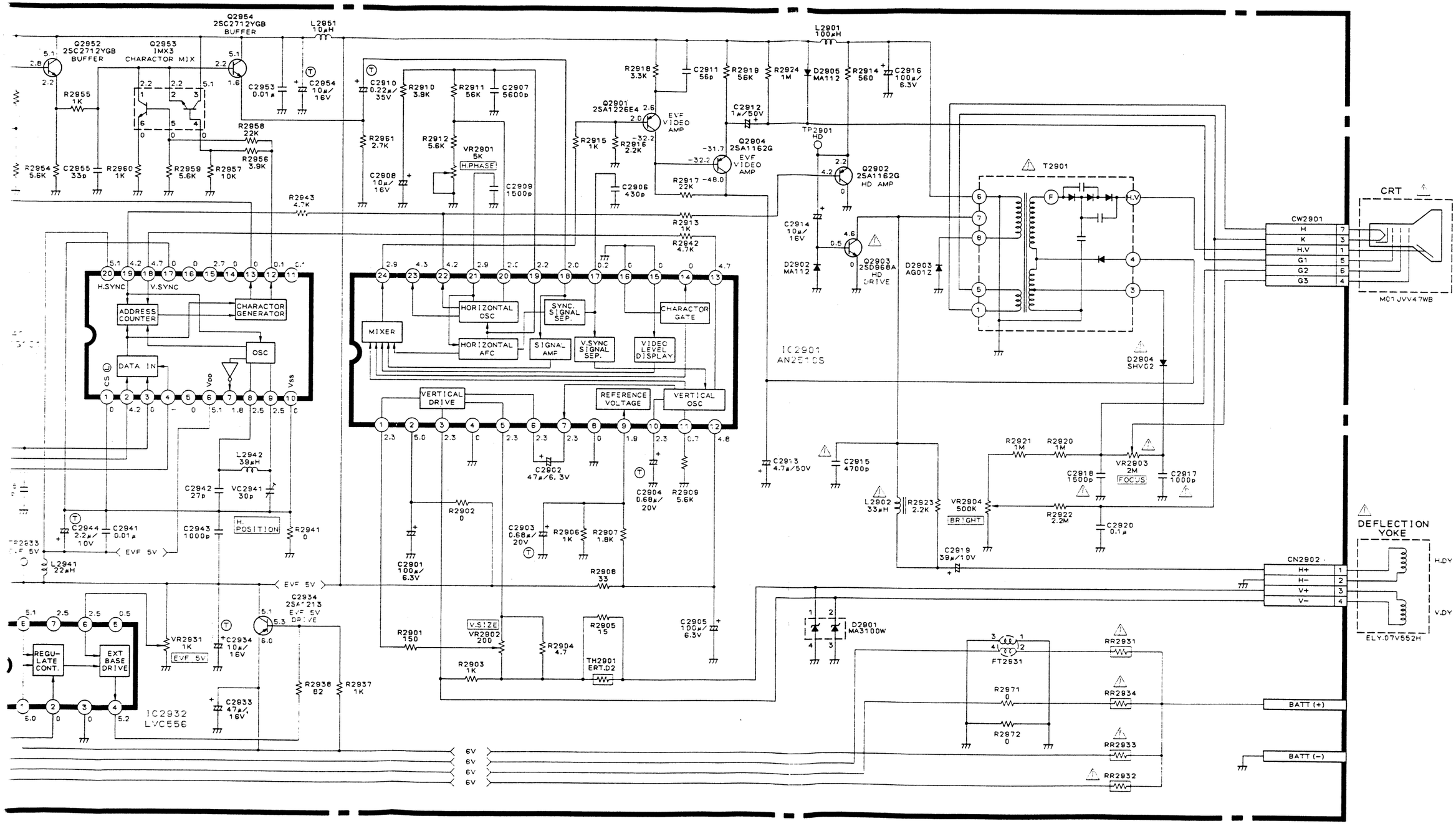


4-2 (3) (REC) 0.2V/10ms

SCHEMATIC DIAGRAM
GRIP C.B.A.



01 Feb. 1989



Supplement

During the production, some adjustments, part Nos., descriptions in the Service Manual were revised. The all revisions have been informed on the Service Manual Reports periodically, and this Supplement is composed of them.

SERVICE MANUAL REPORT INDEX

SMR NO.	DATE	MODEL	NO. TITLE
AD-343P.S	'89. 3	E80E/F	1. Classification No. 2. Tool No. Correction (PII-1) 3. Parts Control Information
AD-347P.S	'89. 4	E80E/F	1. CCD Change 2. CCD Radiation Plate Elimination 3. Constant of Process C.B.A. Change (R2213) 4. Process C.B.A. Change 5. Top Cover Change 6. Constant of EVF C.B.A. Change 7. Audio Video C.B.A. Change 1 8. Audio Video C.B.A. Change 2 9. Adjustment Rating for ATF Recording Current Change 10. Constants of SS C.B.A. Change 11. Connector Change (Pin Jack C.B.A. ↔ Connector A'ssy. 6P) 12. Left Cover Change 13. Lens Rubber Ring Form Change 14. Screws Elimination (Recorder key 1, 2 C.B.A.S) 15. Service Manual Correction (SS C.B.A.) 16. IC601 (Main microcomputer) Change 17. Connector A'ssy. Change (Connector A'ssy. 2P) 18. Screw Size Change 19. Shield Tape Elimination 20. Finder Ass'y. Change 21. Parts Control Information
AD-351P.S	'89. 5	E80E/F	1. Right/Left Covers Change 2. Parts Control Information
AD-352P.S	'89. 6	E80E/F	1. Classification No. (IC601, AD-347 P.S) 2. Parts Control Information

SMR NO.	DATE	MODEL	NO. TITLE
AD-359P	'89. 7	E80E	1. Shield Form Change (Audio Video C.B.A) 2. Rear Cover Form Change 3. Main Microcomputer IC601 (SS C.B.A. Change) 4. Parts Control Information
AD-359S	'89. 7	E80F	1. Shield Form Change (Audio Video C.B.A)
AD-371N.P.S	'89.11	E80A/E/F	1. Flexible Connector Addition (T/W Power Sw.) 2. Parts Control Information
AD-408N.P.S	'90. 7	MC-4B	1. Drive Gear Change 2. Parts Control Information
AD-416N.P.F	'90. 9	E80A/E/F E808A/E/F	1. Part Change 2. Parts Control Information
AD-422N.P.F	'90. 9	MC-4B MC-4C	1. New Service Part Addition 2. Coaster, Right Change 3. Parts Control Information
AD-432P.F	'90.10	MC-4B	1. Remedy for Reel Motor Error
AD-441N.P.F	'90.11	MC-4B	1. New Service Parts 2. Parts Control Information

Canon VIDEO SERVICE MANUAL REPORT

© Technical Service Department, Canon Inc.

Report No. AD-343P·S 1/2

Date March 20, 1989

Canon E80E/F

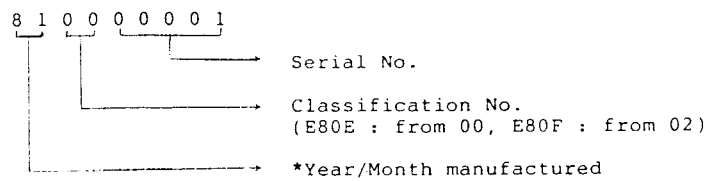
PAL

SECAM

1. Classification No.
2. Tool No. Correction (PII-1)
3. Parts Control Information

1. Classification No.

The classification No. of the product mentioned in the title are stamped as follows.



*

Year \ Month	1	2	3	4	5	6	7	8	9	10	11	12
89	81	82	83	84	85	86	87	88	89	90	91	92
90	01	02	03	04	05	06	07	08	09	10	11	12
91	21	22	23	24	----	----	----					
⋮												

2. Tool No. Correction (PII-1)

2-1 Correction

The following description on the table of maintenance tools list (PII-1) is corrected as follows.

Error		Corrected
DY9-2039-000 115	→	DY9-2039-500 220 (for 220V)
	→	DY9-2039-500 240 (for 240V)

*Remarks : The above corrected tools are established as new service tools.

In details, refer to Service Tools Report (DTR- 045E) issued at the end of March 1989.

3. Parts Control Information :

Changed, Deleted and New service parts : N/A

Canon VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.
Report No. AD-347P·S 1/13
Date April 20, 1989

Canon E80E/F

PAL
SECAM

1. CCD Change
2. CCD Radiation Plate Elimination
3. Constant of Process C.B.A. Change (R2213)
4. Process C.B.A. Change
5. Top Cover Change
6. Constant of EVF C.B.A. Change
7. Audio Video C.B.A. Change 1
8. Audio Video C.B.A. Change 2
9. Adjustment Rating for ATF Recording Current Change
10. Constants of SS C.B.A. Change
11. Connector Change (Pin Jack C.B.A. ↔ Connector A'ssy. 6P)
12. Left Cover Change
13. Lens Rubber Ring Form Change
14. Screws Elimination (Recorder key 1, 2 C.B.A.s)
15. Service Manual Correction (SS C.B.A.)
16. IC601 (Main microcomputer) Change
17. Connector A'ssy. Change (Connector A'ssy. 2P)
18. Screw Size Change
19. Shield Tape Elimination
20. Finder Ass'y. Change
21. Parts Control Information

1. CCD Change

1-1 Change

To reduce the uneveness of dark current, CCD (DH4-0206-000) has been changed.

(With this change, CCD radiation plate is eliminated, etc.. Refer to the following No. 2 through No. 4 for details.)

1-2 Classification : Changed from␣␣05

1-3 Interchangeability : Possible

1-4 Repair Information :

1.When replacing the old type CCD with the new type, change the constant of R2213 on Process C.B.A.s. (refer to item No.3)

2.The new CCD(DH4-0206-000) only is stocked.

3.Perform the following check after the replacement of CCD regardless of its classification No.

1) Shoot the white chart (5600°K), and lock AWB.
2) Shoot the colorbar chart with the standard angle of view.
3) By pushing the BLC switch, check the saturation level of chrominance component. (Yellow,Cyan:saturation acceptable Magenta:slightly light color acceptable, Others:normal color accepted)
4) If the above specification are not obtained, perform the blooming adjustment again. At this time, set the V. SUB voltage a little bit lower.(blooming remained a little)

2. CCD Radiation Plate Elimination

2-1 Elimination

With the CCD change above, the CCD radiation plate is eliminated.

(Screw XA1-7200-357 is also eliminated.)

2-2 Classification : Changed during␣␣05

2-3 Interchangeability : Possible

2-4 Repair Information :

For the new type CCD, the radiation plate is not required.

3. Constant of Process C.B.A. Change (R2213)

3-1 Change

For more accurate back light compensation adjustment, the constant of R2213 is changed as follows.

	Old	New
R2213	47 kΩ	→ 68 kΩ (VR5-7750-683 000)

The new (revised R2213 installed) Process C.B.A.(DG1-0534-000) only is stocked.

3-2 Classification : Changed during␣␣05

3-3 Interchangeability : Possible (refer to the next item.)

3-4 Repair Information :

When replacing the old type CCD with the new type, change the constant of R2213.

4. Process C.B.A. Change

4-1 Change

With the change of CCD, R2319, 2324 and 2328 are eliminated (color suppression at low illumination is released). The new process C.B.A. (the above resistors eliminated) only is stocked. (DG1-0534-000)

4-2 Classification : Changed during␣␣05

4-3 Interchangeability : Possible

4-4 Repair Information :

When replacing the process C.B.A. installed on the old type CCD (before the classification No.␣␣05, 05 not included.) With the new type process C.B.A., install R2319, 2324 and 2328.

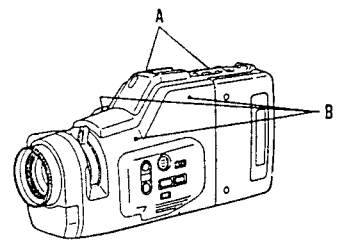
R2319 (VR5-7750-201) R2324, 2328 (VR5-7750-103) are stocked as service parts.

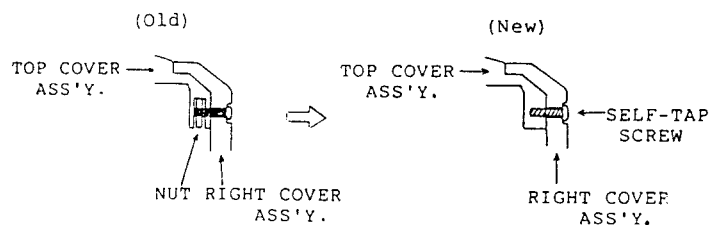
5. Top Cover Change

5-1 Change

For cost efficiency, screws which secure the top cover and the right/left covers have been changed.

With this change, the form of top cover is changed, and also, the plate nuts are deleted.





Sectional View of Screw Parts

	Old	New
Screws (A)	XA1-7200-359 (×2)	XA9-0449-000 (×5) (Self-tap type)
Screws (B)	XA1-7200-459 (×3)	

5-2 Classification : Changed after ␣␣06.

5-3 Repair Information :

1) The new top cover A'ssy. (E80E : DY2-1087-000, E80F : DY2-1088-000) only are stocked.

2) When replacing the old type top cover with the new type, replace the screw with XA9-0449-000.

6. Constant of EVF C.B.A. Change

6-1 Change

To stabilize the vertical oscillation in EVF, the constant is changed as follows.

	Old		New
R2909	5.6 kΩ	→	6.8 kΩ (VR5-2770-682)

6-2 Classification : Changed from␣␣01.

6-3 Interchangeability : Possible

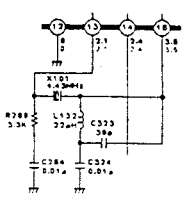
The new EVF C.B.A. (DG1-0550-000) only is stocked.

7. Audio Video C.B.A. Change 1

7-1 Change

To prevent no color reproduction in recording at low temperatures, C323, 325 and L132 are eliminated.

IC105



C323, C324 L132 eliminated (open)

7-2 Classification : Changed from␣␣02

7-3 Interchangeability : Possible

The new Audio Video C.B.A. (DG1-0530-000) only is stocked.

8. Audio Video C.B.A. Change 2

8-1 Change

To lengthen the adjustment range of Playback Luminance Level Adjustment, VR109 (PB Y) is changed as follows.

	Old		New
VR109	470 Ω (VR5-7780-471)	→	1 kΩ (VR5-7780-102)

8-2 Classification : Changed from␣␣02

8-3 Interchangeability : Possible

The new Audio Video C.B.A. (DG1-0530-000) only is stocked.

9. Adjustment Rating for ATF Recording Current Change

9-1 Change

To remove a loss of vertical synchronization when playing back the tape recorded in interval recording mode, the rating for ATF current adjustment is revised. (On the service manual, the rating had been already revised.)

9-2 Classification : Changed from␣␣03

9-3 Repair Information :

When repairing the equipment with the above symptom (before␣␣03), adjust the ATF current with the revised rating specified on the manual.

10. Constants of SS C.B.A. Change

10-1 Change

As the reel sensor was changed (because of the manufacturing maker was changed), the following constants are revised.

	Old		New
R631	3.9 kΩ	→	1.8 kΩ
R656	3.9 kΩ	→	1.8 kΩ
R699	820 Ω	→	560 Ω
R644	820 Ω	→	560 Ω

10-2 Classification : N/A

10-3 Interchangeability : Possible

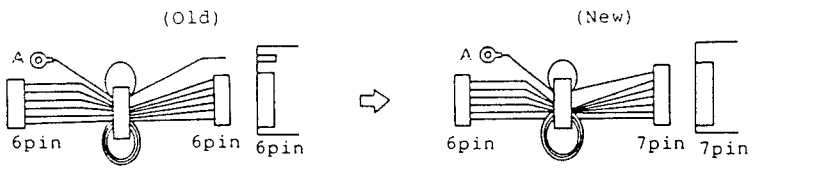
10-4 Repair Information :

The new Type SS C.B.A. (DG1-0529-000) only is stocked.

11. Connector Change (Pin Jack C.B.A. Connector A'ssy. 6P)

11-1 Change

For repairing efficiency, the forms of the Pin Jack C.B.A. and the connector A'ssy. 6P are changed as follows.



CONNECTOR ASS'Y. 6P (DF1-0446-000)	PIN JACK C.B.A. (DG1-0486-000)	CONNECTOR ASS'Y. 6P (DF1-0446-040)	PIN JACK C.B.A. (DG1-0486-010)

11-2 Classification : Changed (informed later)

11-3 Interchangeability :

CONNECTOR ASS'Y. 6P / PIN JACK C.B.A.	Old DF1-0446-000	New DF1-0446-040
Old DG1-0486-000	OK	NG
New DG1-0486-010	NG	OK

11-4 Repair Information :

1) As the new and old type Connector A'ssy.s and Pin Jack C.B.A.s are not interchangeable, the both types are stocked.

2) Remove the earth wire ("A" in the Fig.) as it is not necessary.

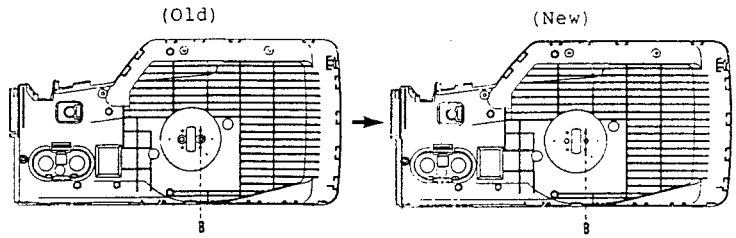
12. Left Cover Change

12-1 Change

To strengthen a grip screw part of the left cover, a supporting plate (Fig. B) is added.

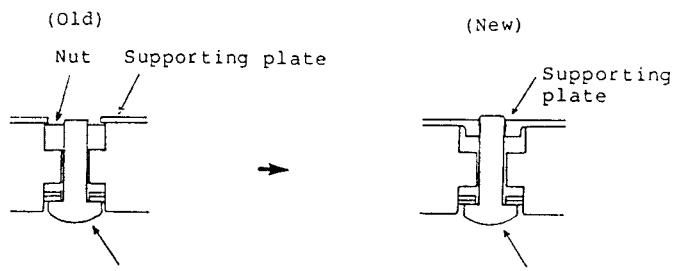
(This supporting plate is not established as a service part.)

* With this addition, the nut is deleted. Fig. A·B



Left Cover A'ssy (DY2-1101-000)

Fig. A



Screw (XB1-1300-809) Screw (XB1-1300-957)

Fig. B Sectional View of Screw Part

Also, the number of screws for the left cover is changed from four to two. Fig. C

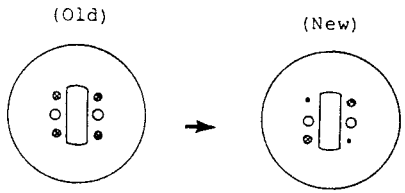


Fig. C

12-2 Classification : Changed after␣␣06.

12-3 Interchangeability :

Left cover Ass'y. / Screw	Old	New DY2-1101-000
Old XB1-1300-809	OK	NG
New XB1-1300-957	OK	OK

12-4 Repair Information :

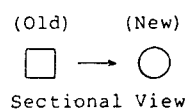
1) When replacing the old type left cover assembly with the new type, use XB1-1300-957.

2) After the replacement, apply Screw Lock 1401B (CY9-1082-000) on contacting surface between the screws and the supporting plate.

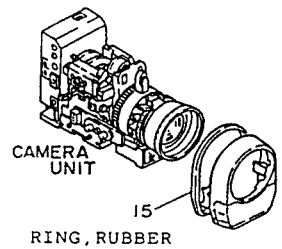
13. Lens Rubber Ring Form Change

13-1 Change

For repairing efficiency, a form of lens rubber ring (DA1-1835-000) is changed as shown below.



Sectional View



13-2 Classification : N/A

13-3 Interchangeability : Possible

13-4 Repair Information :

The new type only is stocked after the old stock depletion.

14. Screw Elimination (Recorder Key 1, 2 C.B.A.s)

14-1 Elimination

For cost efficiency, the screws (XA1-7200-357) of Recorder key 1, 2 C.B.A.s are eliminated.

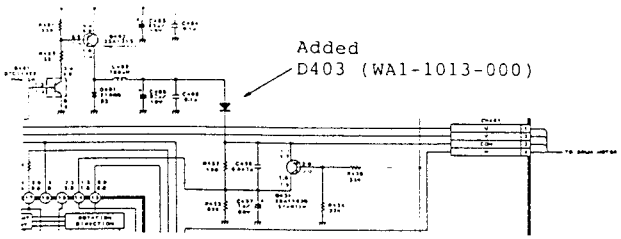
14-2 Classification : N/A

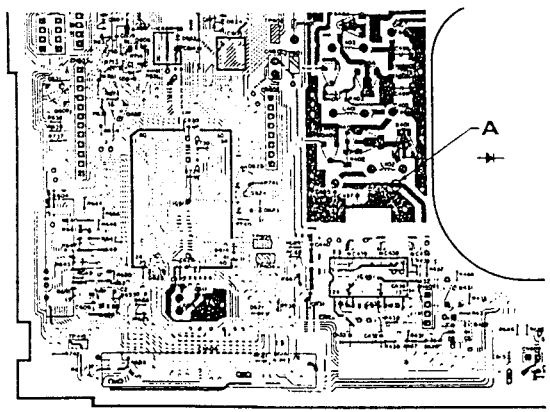
15. Service Manual Correction

15-1 Correction

Add the following diode (D403 : WA1-1013-000) to the position indicated in the figure below.

SS C.B.A.





* The part of pattern ("A" in the Fig.) is cut for D403 installation.

  Also, the land for D403 is added on the pattern.

16. IC601 (Main microcomputer) Change

16-1 Change

The software of IC601 (SS C.B.A.) has been changed. (from the third to the fifth via the fourth)

With this revision, D403 is eliminated, and the chip jumper wire is added instead.

16-2 Classification : Changed (informed later.)

16-3 Repair Information :

1) As the service parts, the fifth IC601 (DH4-0204-000) and the SS C.B.A. where the fifth IC601 mounted (DG1-0529-000) only are stocked.

2) Even after replacing the IC601, D403 is not necessary to be removed.

17. Connector Ass'y. Change (Connector A'ssy. 2P)

17-1 Change

For repairing efficiency, the length of connector A'ssy. (CN4006, DH2-0962-000) is changed from 80 to 40 mm.

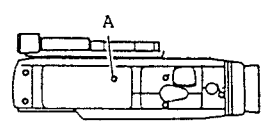
17-2 Classification : N/A

17-3 Interchangeability : Possible

18. Screw Size Change

18-1 Change

To protect wire of recorder key C.B.A. from damaging by a screw point, the length of screw ("A" in the Fig. below) has been shortened.



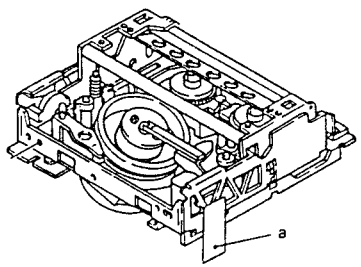
Old		New
XA1-7200-359	→	XA1-7200-309

18-2 Classification : N/A

19. Shield Tape Elimination

19-1 Elimination

For cost efficiency, a shield tape ("a" in the Fig. below) has been eliminated.



19-2 Classification : N/A

19-3 Repair Information

The shield tape is not established as a service part.

20. Finder A'ssy. Change

20-1 Change

To rotate a diopter adjustment ring more smoothly, the form is modified.

20-2 Classification : N/A

20-3 Interchangeability : Possible

20-4 Repair Information

For the service parts of unmodified, paraffine is applied.

21. Parts Control Information

21-2 Deleted parts : N/A

21-3 Changed parts :

DA1-1835-000	Deleted after old stock depleted.
DH2-0962-000	New only stocked after old stock depletion.
DH4-0204-000	New only stocked.
DH4-0206-000	New only stocked.
DG1-0529-000	New only stocked.
DG1-0530-000	New only stocked.
DG1-0534-000	New only stocked.
DG1-0550-000	New only stocked.
DY2-1087-000	New only stocked.
DY2-1088-000	New only stocked.
VR5-2770-682	Added to Parts List.
VR5-7750-103	Added to Parts List.
VR5-7750-222	Added to Parts List.
VR5-7780-102	Added to Parts List.
VR5-7780-471	Q'ty. changed from 2 to 1.
XA1-7200-309	Added to Parts List.
XA1-7200-357	Q'ty. changed from 12 to 9.
XA1-7200-359	Q'ty. changed from 3 to 0. (Stocked as usual).
XA1-7200-459	Q'ty. changed from 13 to 10.
XB1-1300-809	Deleted after old stock depleted.
DY2-1101-000	New only is stocked.

21-3 New Service Parts :

PART NO.	CLASS	Q'TY.	DESCRIPTION
DF1-0446-040 000	C	1	CONNECTOR ASS'Y. 6P
DG1-0486-010 000	C	1	PIN JACK C.B.A.
VR5-7750-683 000	C	1	RESISTOR 68 kΩ
XA9-0449-000 000	F	5	SCREW, CROSS-RECESS, PH
XB1-1300-957 000	F	2	SCREW

Canon VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.

Report No. AD-351P·S 1/2

Date May 20, 1989

Canon E80E/F

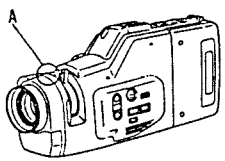
PAL
SECAM

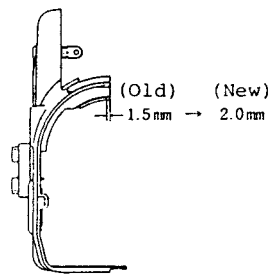
1. Right/Left Covers Change
2. Parts Control Information

1. Right/Left Covers Change

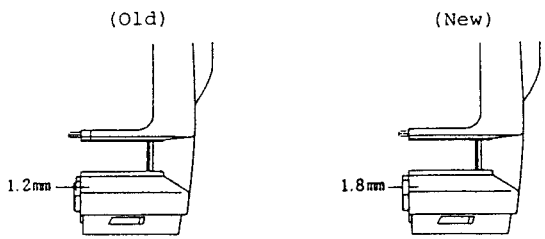
1-1 Change

To strengthen matching surfaces ("A" in the figure) of Right/Left covers, each forms are changed as follows.





Left cover (DY2-1101-000)



Right cover (E80E DY2-1089-000 / E80F DY2-1090-000)

1-2 Classification: Not changed (Changed during 06)

1-3 Interchangeability

Right cover \ Left cover	Old	New
Old	o	o
New	×	o

o: Interchangeable
×: Not interchangeable

1-4 Repair Information

The new Right/Left covers only are stocked.
The new right cover can be used with the old left cover by cutting "A" part as specified.

2. Parts Control Information

2-1 Deleted parts: N/A

2-2 Changed parts:

DY2-1089-000	New only stocked.
DY2-1090-000	New only stocked.
DY2-1101-000	New only stocked.

2-3 New Service Parts: N/A

Canon VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No. AD-352P·S 1/1

Date June 20, 1989

Canon E80E/F

PAL

SECAM

1. Classification No. (IC601, AD-347P·S)
2. Parts Control Information

1. Classification No. (IC601)

The classification No. for the IC601 (Main microcomputer, AD-347P·S No. 16) has been changed as follows:

· Classification No.: Changed from 07.

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts : N/A

2-3 New Service Parts : N/A

Canon VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No. AD-359P 1/2

Date July 20, 1989

Canon E80E

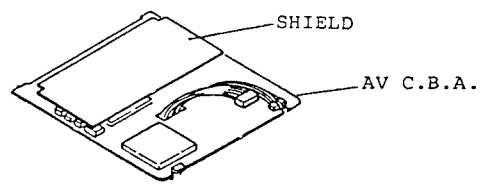
PAL

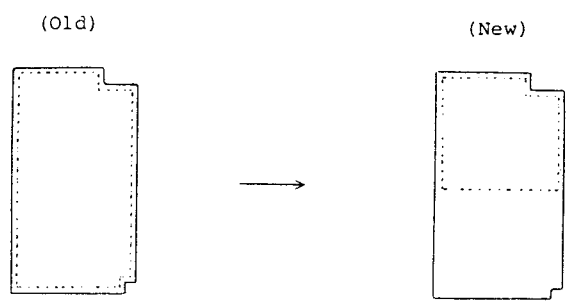
1. Shield Form Change (Audio Video C.B.A.)
2. Rear Cover Form Change
3. Main Microcomputer IC601 (SS C.B.A. Change)
4. Parts Control Information

1. Shield Form Change (Audio Video C.B.A.)

1-1 Change

A shield form of Audio Video C.B.A. has been changed as follows.





----- Copper sheet
——— Polyester sheet

1-2 Classification : Changed from □□05.

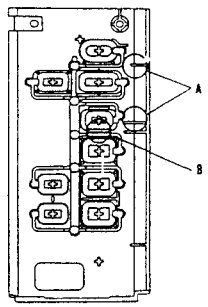
1-3 Interchangeability : Possible

1-4 Repair Information : The shield is not established as a service part.

2. Rear Cover Form Change

2-1 Change

To prevent a rear cover from getting onto the R-KEY2 C.B.A. by shock, hight of ribs (A and B in the figure below) are changed as follows.
The new Rear Cover Ass'y. (DY2-1091-000) only are stocked.



(New)
A +2mm
B -2.5mm

Rear Cover Ass'y.
(DY2-1091-000)

2-2 Classification : Changed from ␣␣08.

2-3 Interchangeability : Possible

3. Main Microcomputer IC601 Change (SS C.B.A.)

3-1 Change

To correct an auto date character display (ARP.→APR.), the software of the main microcomputer IC601 (SS C.B.A.) has been changed from the fifth to the sixth.

5th		6th
CXP80116-139Q	→	CXP80116-155Q

3-2 Classification : Changed from ␣␣10.

3-3 Interchangeability : Possible

When the IC601 is changed from the third or fourth to the sixth, the jitter performance in interchangeability and self-recording are improved, however, the jitter performance of playbacked picture recorded with the third or fourth IC601 is deteriorated when playbacked with the sixth.

3-4 Repair Information

As the service parts, IC601 (DH4-0204-000) and SS C.B.A. (DG1-0529-000) where the sixth IC601 mounted only are stocked.

4. Parts Control Information :

4-1 Deleted, Changed, New Service Parts : N/A

Canon VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.
Report No. AD-359S 1/1
Date July 20, 1989

Canon E80F

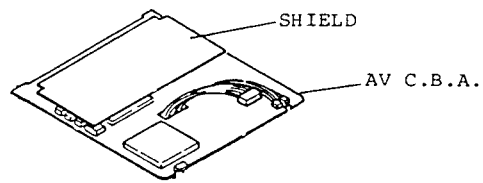
1. Shield Form Change (Audio Video C.B.A.)

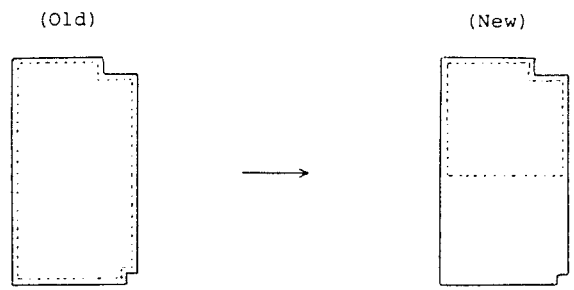
SECAM

1. Shield Form Change (Audio Video C.B.A.)

1-1 Change

A shield form of Audio Video C.B.A. has been changed as follows.





----- Copper sheet
——— Polyester sheet

1-2 Classification : Changed from ␣␣05.

1-3 Interchangeability : Possible

1-4 Repair Information :

The shield is not established as a service part.

Canon VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.

Report No. AD-371N·P·S
1/1
Date November 20, 1989

NTSC
PAL
SECAM

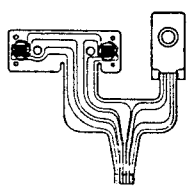
Canon E80A, E, F

1. Flexible Connector Addition (T/W Power Sw.)
2. Parts Control Information

1. Flexible Connector Addition (T/W Power Sw.)

1-1 Addition

To meet the request from the market,a flexible connector (DH2-0955-000) is established for the T/W Power Sw. as a new service part.



2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts : N/A

2-3 New service part :

PART No.	CLASS	Q'TY.	DESCRIPTION
DH2-0955-000	C	1	FLEXIBLE, CONNECTOR

Canon VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.

Report No. AD-408N·P·S
1/1
Date July 20, 1990

NTSC
PAL
F·PAL

Canon MC-4B

1. Drive Gear Change
2. Parts Control Information

1. Drive Gear Change

1-1 Change

From the H800 series, the MC-4C has been mounted instead of the MC-4B. With this change, the following parts are changed. (consolidated with the parts for the MC-4C)

Old		New
DY4-2667 (White)	→	DY4-2742 (Yellow)
DY4-2668 (Blue)	→	DY4-2743 (Green)

1-2 Classification : N/A

1-3 Interchangeability :

- For the MC-4B, both types (old and new) can be used.
- For the MC-4C, the new type only can be used.

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts : DY4-2667 Deleted after old stock depleted.
DY4-2668 Deleted after old stock depleted.

2-3 New Service Parts

PART NO.	CLASS	Q'TY.	DESCRIPTION
DY4-2742-000 000	C	1	GEAR
DY4-2743-000 000	C	1	GEAR

Canon VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc
Report No. AD－416N·P·F－PAL 1/1
Date September,20,1990

Canon E80A,E,F/E808A,E,F

1. Part Change
2. Parts Control Information

NTSC PAL F-PAL

1.Part Change

1－1 Change

For parts availability, a Flexible Connector Ass'y (DY2－0955－000) has been deleted.
Instead, a Zoom Switch Ass'y.(DY2－1310－000 for E80, DY2－1311－000 for E808) is added.

2. Parts Control Information

2－1 Deleted part: DH2－0955－000

2－2 Changed parts: N/A

2－3 New Service parts:

PART No.	CLASS	Q'TY.	DESCRIPTION
DY2－1310－000	D	1	ZOOM SWITCH ASS'Y.(E80)
DY2－1311－000	D	1	ZOOM SWITCH ASS'Y.(E808)

Canon VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.
Report No. AD－422N·P·F－PAL 1/2
Date September,20,1990

Canon MC－4B,MC－4C

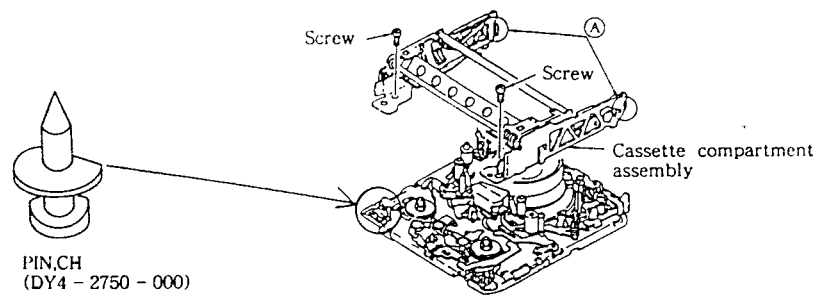
1. New Service Part Addition
2. Coaster, Right Change
3. Parts Control Information

NTSC PAL F-PAL

1. New Service Part Addition

1－1 Addition

The following positioning pin is added as a new service part for a cassette housing (S－side).



1－2 Repair information

·How to use the positionig pin

1) Dismount the C.B.A.S and cassettecompartment.

2) Cut off "" indicated part (three points) in the figure.

3) Face the cut—off part toward a side of loading motor.
Then, push it until it touches the depression of mechanical chassis completely. (Fig.b)

4) Confirm the position of it, and secure with the Alonalpha or equivalent. (Fig.c)

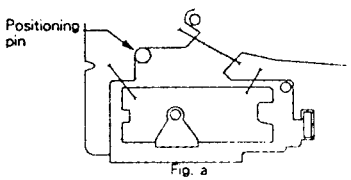


Fig. a

5) Check the tape transport.

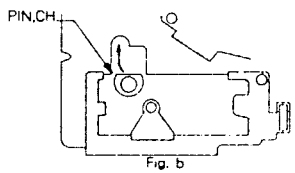


Fig. b

3.Parts Control Information

3 – 1 Deleted/Changed parts: N/A

3 – 2 New service part

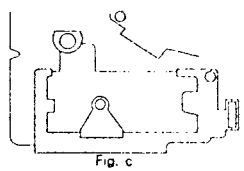


Fig. c

PART No.	CLASS	Q'TY	DESCRIPTION
DY4 – 2750 – 000	C	1	PIN, CH

Canon VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc

Report No. AD – 432P·F – PAL 1/1

Date October 20,1990

Canon MC – 4B

PAL

F-PAL

·Remedy for Reel Motor Error

Due to the variation of mechanism loading and the driving system of loading motor, the loading motor may be sometimes driven forward and backward repeatedly at ejecting. To repair this, perform the following measure.

1. Affected models :

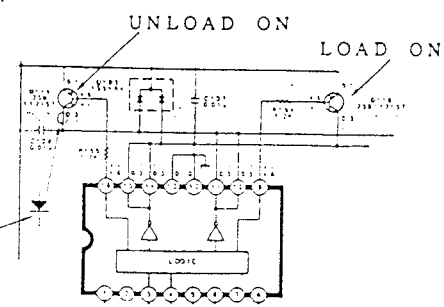
E80E,F E808E,F A1E,F

*Remarks : From the A1HiE,F, the MC – 4C has been mounted instead of the MC – 4B. The symptom will not occur because the MC – 4C adopts the pulse driving method.

3. Remedy

Check the MC – 4B of above symptom (Not – ejectable) if its loading motor moves forward and backward repeatedly, by repeating loading/unloading without the tape.

If the symptom occurs, add a diode to the connector of transistor (which turned on at unloading) to decrease the driving voltage at unloading. (Cut a pattern partly.)



Canon VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.

Report No. AD-441N·P·F-PAL
1/2
Date November 20, 1990

Canon MC – 4B

NTSC
PAL
F-PAL

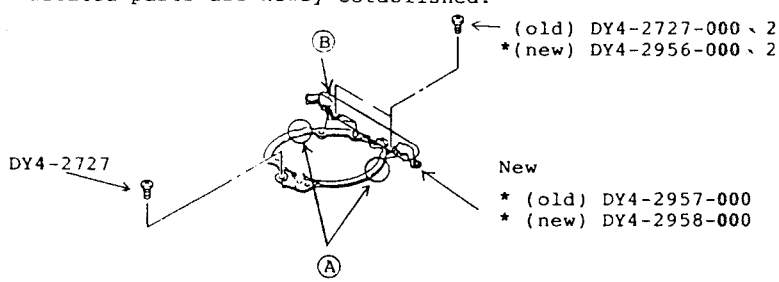
1. New Service Parts
2. Parts Control Information

1. New Service Parts

1-1 Addition

For the market request, two types (old and new) of drum base and a screw for the new type have been established as new service parts.

* indicated parts are newly established.



Remarks for the new type drum base :

Ⓐ parts are convex to match with the concave parts of mechanical chassis.
Ⓑ part is thicker than the old type.

1-2 Repair information

The MC-4B which has been manufactured around May, 1989 has the both types (old and new) of drum base, mechanical chassis and screw.
As they do not have an interchangeabilities each other, check the difference of shape when replacing.

Drum Base	Old	New
	↕	↕
Mechanical Chassis	Old	New

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts : N/A

2-1 New service parts :

PART NO.	CLASS	Q'TY.	DESCRIPTION
DY4-2956-000	C	1	SCREW
DY4-2957-000	C	1	BASE, DRUM
DY4-2958-000	C	1	BASE, DRUM